for Atari Computers (XL Compatible)

Antic®

The ATARI® Resource

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SEPTEMBER 1984 VOLUME 3, NUMBER 5



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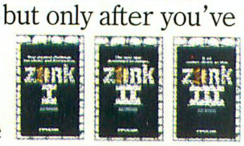
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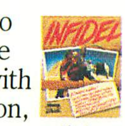


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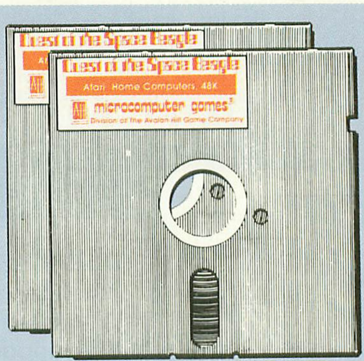


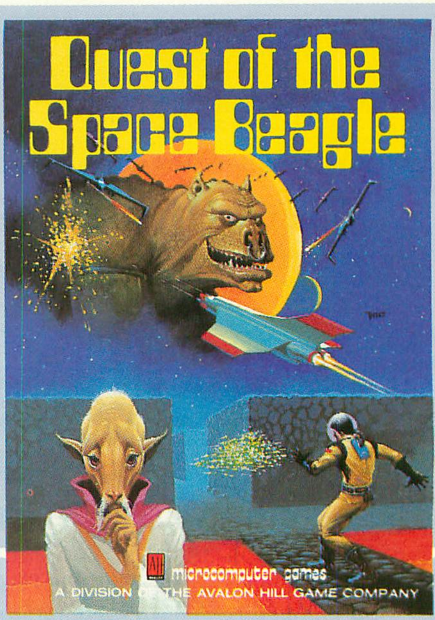
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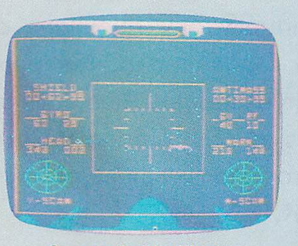
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Quest of the Space Beagle®

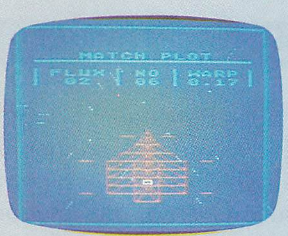




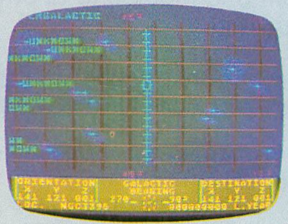
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■ Befriended by the Faunians, a peaceful race being invaded by the evil Gentuzians, they have decided that YOU must launch a pre-emptive strike against the Gentuzian homeworld. You must command 10 Faunian robot fighters against the Gentuzian battle fleet which outnumbers you four to one! It won't be easy; you'll need the right tactics and all the skill and patience you can muster.

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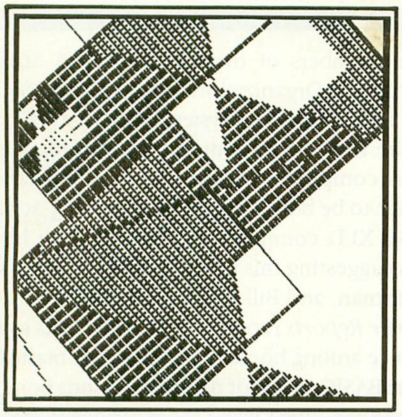
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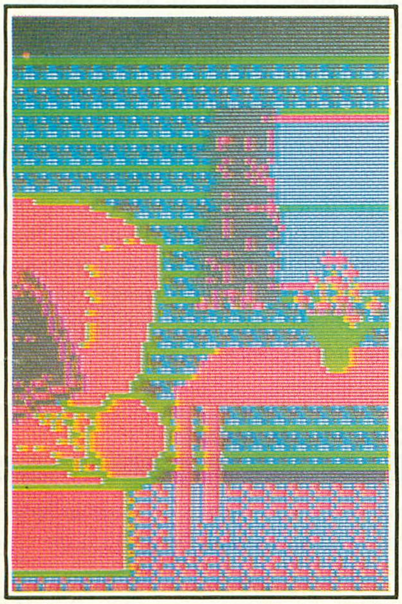
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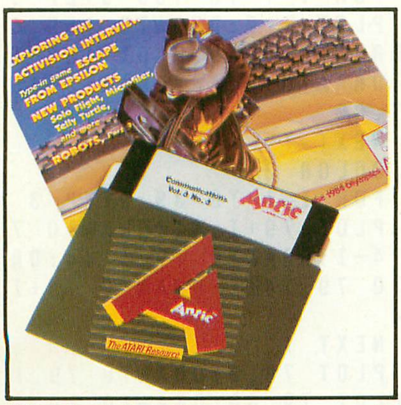
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Atari art .... page 37



Disk subscription offer .... page 50

FEATURES

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i/o board

HANDLING YOUR RS-232

I have a serial RS-232 printer connected to the Atari 850 interface box. It works fine when I'm writing in BASIC, but when using software that expects a parallel printer port, of course it doesn't work. Is it possible to POKE the location where the printer handler, is, redrecting it to the location of the RS-232 handler? Where is the RS-232 handler kept?

Jim Riess
Sudbury, MA

The RS-232 handler isn't resident in the Atari OS—it must be loaded from disk: turn on the 850 interface, then boot from the Atari DOS Master Disk or from a disk containing the AUTORUN.SYS file (from the Master Disk). This loads the RS-232 handler and adds its address to the handler table. Then simply use the RS-232 port as another I/O channel. First, OPEN #1,8,0"R1:", then use PRINT #1 or PUT #1 to send data to the port. Finally, CLOSE #1. Of course, this can only be used to modify BASIC programs that use the printer.

Modifying machine language programs that use printers, such as LJK's Letter Perfect requires extensive technical expertise and probably wouldn't be worth the trouble. As far as we know, the only commercial word processing program for the Atari using the RS-232 port is Atari's own Atariwriter. Choose SAVE from the main menu, then type R1: at the prompt for device and file name. If you use Atariwriter without a disk drive, the RS-232 handler is automatically booted if the 850 is turned on and connected before the computer is turned on. —ANTIC ED

ANTIC AUTHORS

I am 14 years old and am the proud owner of an Atari 800. Is it possible for me to write an article for **Antic** and for you to then publish it?

Michael Plotnik
Brooklyn, NY

We always encourage readers, of all ages, to submit material for publication. Of course, we reserve the right to decide whether or not to use a submission. If you would like more information, please send a self-addressed stamped envelope to **Antic**, *requesting our Author's Guide.* —ANTIC ED

A VOTE FOR BASIC XL

The members of the Westmoreland Atari Computer Organization believe that BASIC XL, from Optimized Systems Software (OSS), is the best programming language for the Atari computer. We feel it is the ideal language to be built into the forthcoming Atari 1450 XLD computer. We have written letters suggesting this to James Morgan, Atari's chairman, and Bill Wilkinson of OSS. *Consumer Reports* recently rated Atari as its top choice among home computers, but blasted Atari BASIC as one of the main reasons home computers aren't taken more seriously. Atari is letting a golden opportunity slip by if it doesn't market BASIC XL as an extended BASIC.

George J. Adamson
Newsletter Editor
Westmoreland Atari
Computer Organization
North Huntingdon, PA

We agree that BASIC XL is an excellent version of BASIC. We'd like to point out, however, that Atari currently markets Microsoft BASIC II, a cartridge-based extended BASIC. By the way, George is a frequent contributor to Antic. —ANTIC ED

MORE FROM MORI

I have written a graphics program in mode 7, called "Three-Color Demo." I hope you enjoy this:

```
1Ø GRAPHICS 7+16:COLOR 1
2Ø FOR T=1 TO 159 STEP 5
3Ø PLOT T,Ø:DRAWTO 159,4
4:DRAWTO T,89:PLOT 159-T
,Ø:DRAWTO Ø,44:DRAWTO 15
9-T,89
4Ø NEXT T
5Ø COLOR 2
6Ø FOR I=1 TO 3Ø STEP 3
7Ø PLOT 79+I,44:DRAWTO 7
9,74-I:DRAWTO 79-I,44:DR
AWTO 79,14+I:DRAWTO 79+I
,44
8Ø NEXT I
9Ø PLOT 79,Ø:DRAWTO 79,1
4:PLOT 79,89:DRAWTO 79,7
4:PLOT Ø,44:DRAWTO 79,44
:PLOT 159,44:DRAWTO 79,4
4
```

i/o board

```
100 COLOR 3
110 FOR I=1 TO 89 STEP 2
120 PLOT I,0:DRAWTO 159,
I:DRAWTO 159-I,89:DRAWTO
 0,89-I:DRAWTO I,0
130 PLOT 159-I,0:DRAWTO
0,I:DRAWTO I,89:DRAWTO 1
59,89-I:DRAWTO 159-I,0
140 NEXT I
150 REM ATARI LOGO MARK
160 COLOR 2
170 FOR I=0 TO 89
180 PLOT 0,I:DRAWTO 159,
I
190 NEXT I:COLOR 0
200 FOR I=30 TO 60 STEP
2
210 PLOT 68,I:DRAWTO 72,
I:PLOT 76,I:DRAWTO 78,I:
PLOT 82,I:DRAWTO 86,I
220 NEXT I
230 FOR I=60 TO 70 STEP
2:Q=Q+2
240 PLOT 68-Q,I:DRAWTO 7
2-Q,I:PLOT 76,I:DRAWTO 7
8,I:PLOT 82+Q,I:DRAWTO 8
6+Q,I
250 NEXT I
260 GOTO 260
```

Masahiro Mori
Taichung, Taiwan

TRACE TROUBLE REVISITED

This is an answer to a question posed by Paul Mattia in June I/O Board, entitled "Trace Trouble." The problem has been documented by Bill Wilkinson of Optimized Systems Software. If you use the CPY#xxx instruction and try to trace the program using the Assembler/Editor cartridge in the debugger mode, the trace aborts. There is no solution for this problem. The best thing to do is not to use CPY#, but use CPX# instead. Try this: Instead of using CPY#$10, use

```
CPY CNSTNT
CNSTNT .BYTE $10
```

This will solve the problem.

Robert Davis
Sheffner, FL

ATARI OVERSEAS

Prior to buying my new system (including computer, disk drive, interface module, printer, and color monitor) in Canada to use in Israel, many people, including Atari salesmen, said the system wouldn't work with Israel's 220-volt, 50-Hz electricity supply, (the same system used throughout Europe). I'm delighted to report that, with the use of a simple stepdown transformer (220 to 110 volts), my system works perfectly.

Mr. Euphraty
Netanya, Israel

Readers should note that Mr. Euphraty bought his monitor at the same time as the rest of his system. A computer manufactured for the North American market is not compatible with European standard of television signal transmission. —ANTIC ED

CASSETTE AUTO BOOT?

I'm building an alarm system and would like to have a fully automatic boot capability for my 48K Atari 400 and cassette drive, instead of having to leave the unit on and programmed. When nobody is home, there's no one to press the Off-Start-Return sequence. Any help in this area?

Eddie Leach
Gainesville, FL

As far as we know, there's no way to automate booting an Atari cassette system. If there's nobody around to start the system, why not turn it on when you leave, for greater security? —ANTIC ED

KUDOS AND QUESTIONS

Hats off to the finest Atari-oriented magazine! The games are outstanding! Keep up the good work. Superb graphics are tops on the list, too.

Will Roadrace and GTIA Sketchpad work on the unexpanded (16K) Atari 600XL?

Milson Luce
Kenner, LA

Thanks for the kind words! We will continue to bring you the best games and graphics. Neither of the two programs you mentioned will work on the unexpanded 600 XL. —ANTIC ED

ATARI SOLD TO TRAMIEL

Just as this issue of **Antic** was going to press, the news came that Atari's computer and videogame divisions were sold by Warner Communications to a new Hong Kong-based company headed by Jack Tramiel, the tough, hard-driving ex-president of Commodore computers.

Tramiel (pronounced tra-mel) was already operating Atari's Sunnyvale headquarters the day the announcement was made. He promptly issued a statement that his goal was to make Atari "number one—nothing less."

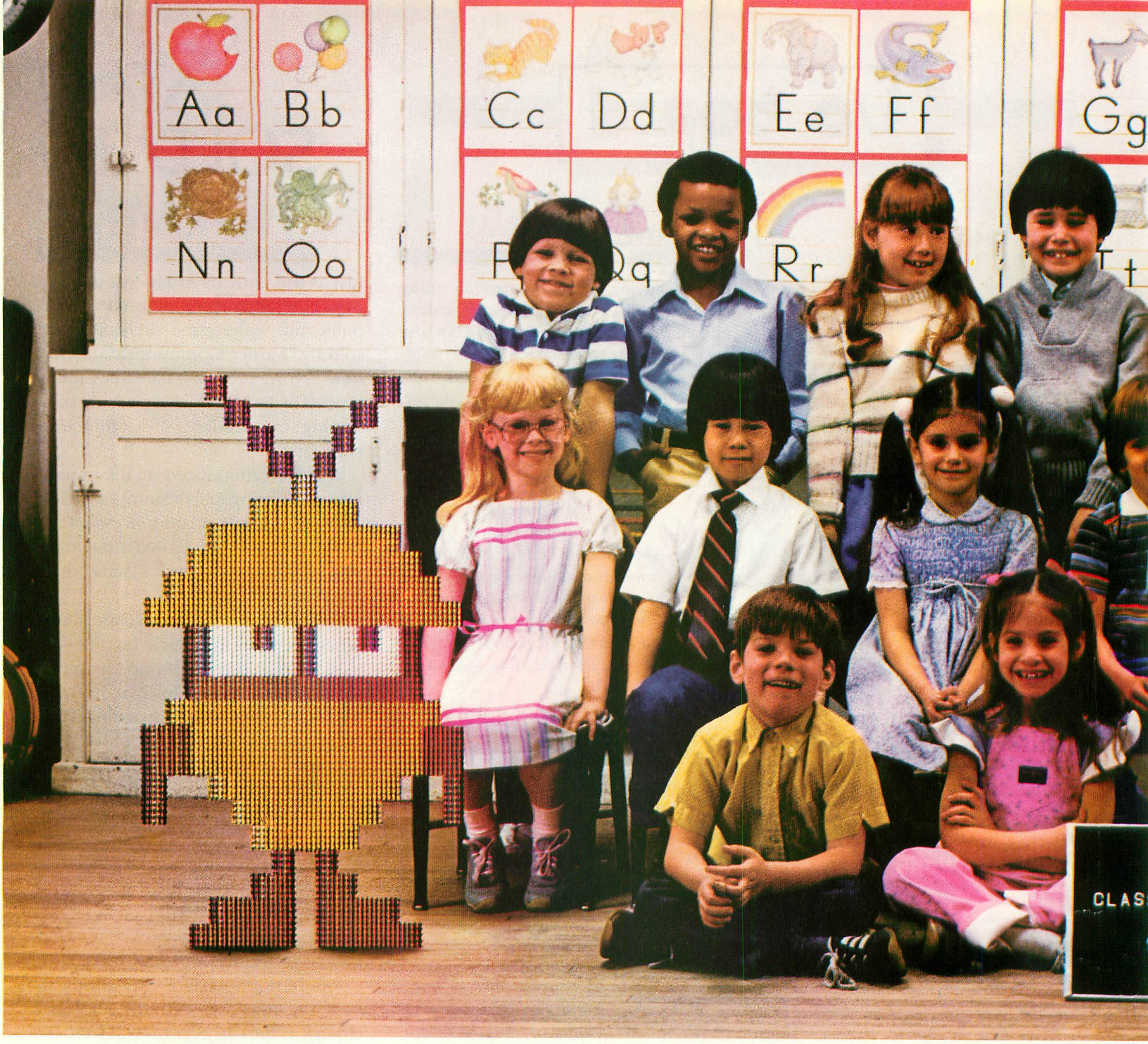
Talk like that must be taken seriously when it comes from Jack Tramiel—the man who sold more home computers than anybody else in history, and who is famous for consistently cutting prices below the competition.

Our sources tell us that Tramiel showed up in Sunnyvale with a complete plan for obtaining all components of the 800XL computer at lower cost. Now that Atari's overhead has been cut so drastically, **Antic** believes that the 800XL will be not only the best—but also the most affordable—64K computer on the market this Christmas.

We think the chances are good that over the next few months Atari will emerge as the Chrysler of high-tech, the biggest comeback story in the history of the computer industry.

Whatever happens, **Antic** will continue to be the Number One source of information and guidance for all Atari computer owners. We'll have a lot more details for you in our next issue. And we'll especially be looking for the latest news on how you can get any Atari customer service problems taken care of.

Finally, here's a call to APX program authors, all Atari software developers and third-party hardware vendors. If you're looking for a way to market your products directly, phone Gary Yost at **Antic** right away. We may be able to help you . . .



Modern times have create

We've cleverly disguised them as funny creatures from a computer game. But underneath the funny exterior is one of the most serious approaches to home education you've ever heard of.

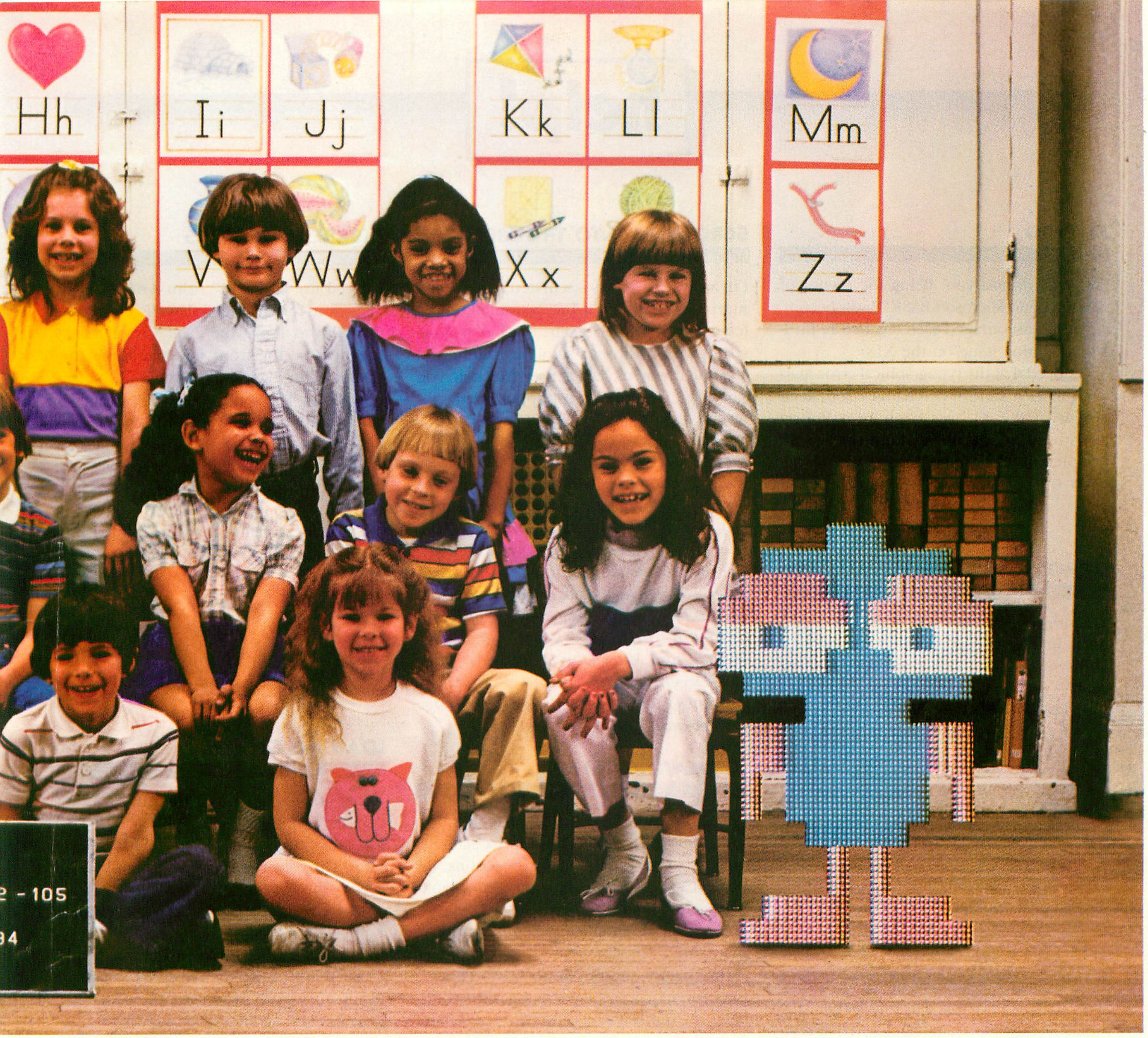
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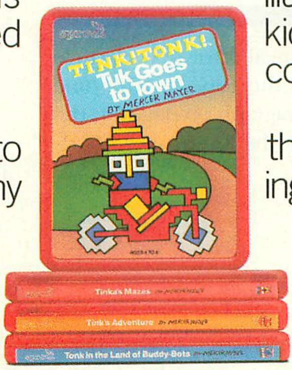
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We've also got the experience of Mercer Mayer, who has written or illustrated 80 children's books. He dazzles kids with ideas and pictures that keep them coming back for more.

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sprout

Games that grow up. Instead of wear out.

help!

XL TYPO

I'm glad I found you. Being the owner of a 1200XL and Microsoft BASIC, I was becoming more discouraged each day before finding your June issue on the XLs.

I noticed that the typographical error Atari made in their table of OS changes from Revision B to the XL was copied (in Robert DeWitt's article on the evolution of the XL computers). The last hex address should be 03FB–03FC instead of 033FB–03FC.

John Tilton
Carlsbad, CA

MEMORY WINDOW

In your program "Memory Window," (April 1984), line 160 should read . . .";MEM+255". This will give the proper memory reading in the window. For example, page 0 resides in location 0–255, not 0–256.

Bill Travis
Salt Lake City, UT

ERRATA

In our review of Ultima I (**Antic**, July 1984), the author's name should have been Keith Valenza. We apologize for the error.

APX LIVES ON

Many readers have asked us how to get APX programs now that Atari has closed that division. Al Thomas, Manager of Sales and Manufacturing for APX tells us that twenty of the best APX programs, including EXCALIBUR, GETAWAY and ATARI PRINTER DRIVER, will continue to be sold. You can obtain a complete list of titles and a new order form by calling: (800) 672-1404 inside California, (800) 538-8543 outside California or by writing:

APX
c/o ATARI CUSTOMER SERVICE
1312 CROSSMAN AVENUE
SUNNYVALE, CA. 94088

Al informs us that the turnover on APX orders is just 3–4 days using the new forms. If you use an old form from the catalogue to order a product no longer available, the turnover can take weeks!

SCROLLING INTO TROUBLE

I'm a student who is fascinated by what my Atari 400 can do, but I've stumbled onto a few problems. Specifically, I've had trouble setting up a horizontal-scrolling routine and creating my own character set. Any help you can offer would be most appreciated.

Richard Tan
Vancouver, B.C., Canada

Antic's publisher, James Capparell, has written an article on scrolling that may help you. Entitled simply, "Scrolling," it appears in our recently-published anthology, The Best of **Antic**, Volume One.

*Several articles that explain how to create your own character set have recently appeared in **Antic**. See "Odd Man Reforms" by John and Mary Harrison (**Antic**, page 36, December 1983) and "Character Graphics" by Chris Chabris (**Antic**, page 60, February 1984).*—ANTIC ED

ANIMATING TANKS

In your June 1984 article "Use Basic to Animate," you stated that the **Antic** staff was unable to eliminate the instructions for Players 2 and 3 because the remaining tanks would not fire.

You cannot eliminate the entire line. The first item on the line must be retained. The listing below allows you to select either a two, three or four player game. It then disables the unused tanks and eliminates them from the screen.

Please keep up the good work. I learn something every time I type in one of your listings.

Charles Barker
Lawrenceburg, IN

SCROLL YOUR WAY TO THE TOP

There is a typographical error in the article "Scroll Your Way to the Top" (**Antic**, June 1984). In the last paragraph on page 44, the number 1586 should be 1536.

DISKREAD SECTORS

I typed in "Diskread" from **Antic**, March 1984, and found a small flaw. If you request the utility to display the "next" sector, it finds the next sector from information in the "pointer" in the last three bytes of the current sector. The sectors (360–368) that contain the VTOC (volume table of contents) and disk directory don't use this pointer, so attempting to display the next sector while displaying a directory sector won't work correctly.

I've made a change that corects this problem. Insert the following line into the program:

```
215 IF NUM>359 AND NUM<369 THEN
    NES=NUM+1:GOTO 250
```

Edward Aubitz
Bloomington, MN

LOADING GLOOP

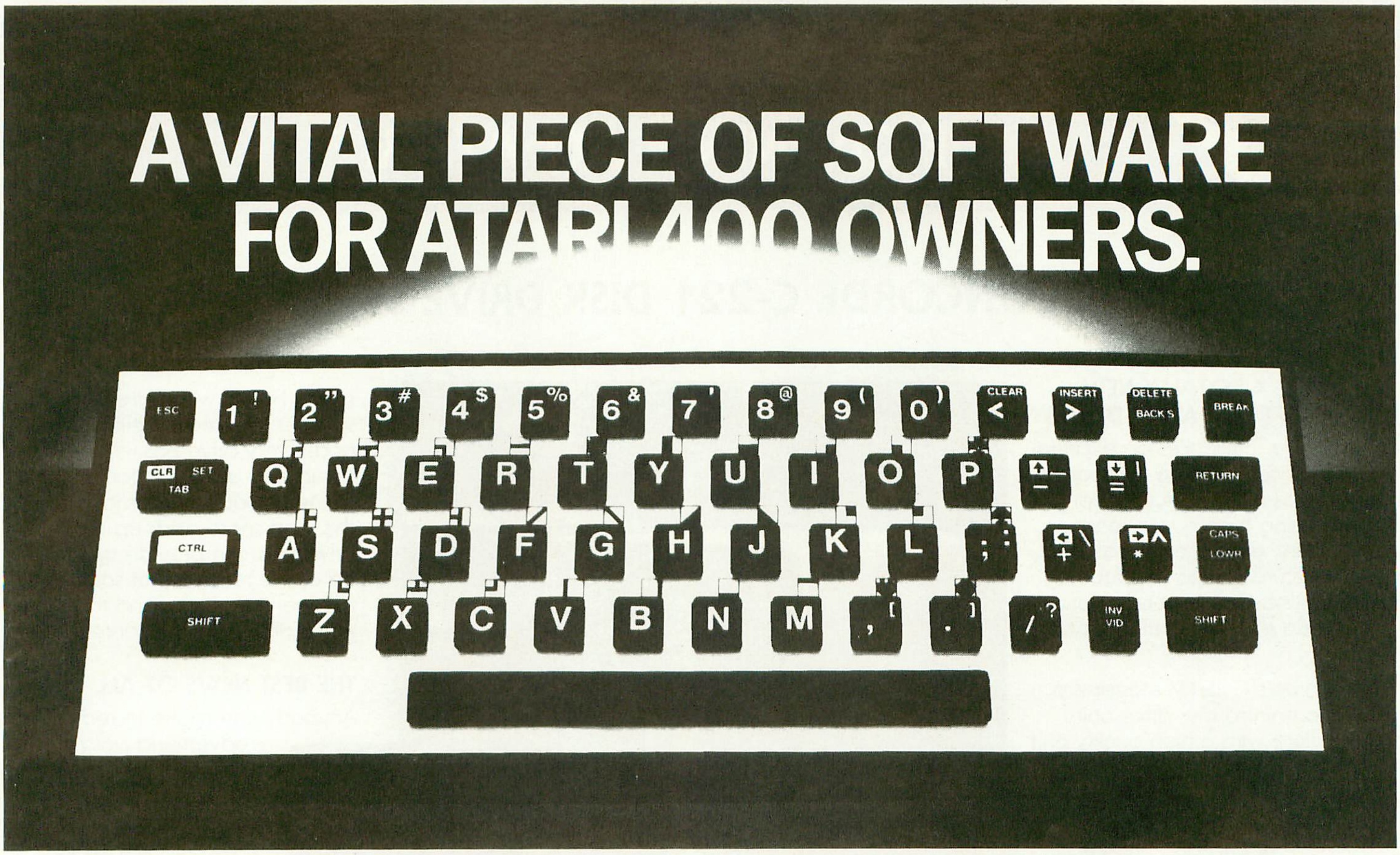
Bravo to you and to Guy Aitchison for "Galactic Gloop" (**Antic**, February 1984)—it's one of the best games in BASIC I've ever seen. The song is great, and the graphics are out of this world!

I have a disk-based system, however, and I quickly got tired of typing in special commands each time I loaded the game, so I wrote this little program to ease the task. To use it, first SAVE or rename the game program as "GALACTIC." Then type in this program and SAVE it as "GLOOP." Then RUN"D:GLOOP".

Please print my full address, so that other readers who'd like to talk computers or swap programs can get in touch with me.

```
 0 REM Pre-load initialization for
   Galactic Gloop
10 GRAPHICS 0:SETCOLOR 2,0,0
20 ? :? :? "POKE 743,114:POKE 744,46":?
   :? :? "NEW":? :? :? "LOAD ";
   CHR$(34); "D:GALACTIC";CHR$(34)
   :? :?
30 ? "POKE 842,12:RUN"
40 POSITION 2,0:POKE 842,13:STOP
```

Mike Wildridge
R.R. #1 Box 35A
Lawrenceburg, IN 47025



A RUBBER KEYBOARD.

The flat keyboard of the Atari 400 isn't very satisfactory to use.

It simply doesn't put you in touch with the computer in the same way as a push button one.

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EXCEPTIONAL DESIGN

The Concorde C-221 models were specifically designed to visually complement your Atari system. Sleek metal cases provide durability and rigidity not available with plastic. Large, easy to use controls have been simplified for ease of operation. Simple indicator lights provide essential data that you can use, not just extraneous information. And, in addition to being easy to use and looking great, we designed the C-221 series to take up less space than competitive models, meaning you'll have more valuable workspace available around your Atari system.

WE DIDN'T FORGET THE DETAILS

Every Concorde disk drive system is built with exacting attention to detail. The C-221 series is no exception. From initial design, through the manufacturing and testing processes, Concorde drives are expected to meet the most critical evaluation standards. That's why we use components like direct drive motors for better speed control than typical belt drives. Optical track zero sensors rather than mechanical stops for greater accuracy and longer head alignment life. Die cast metal heads with glass bonded surfaces for greater reliability, and, every drive has its electronics fully burned-in for 48 hours to insure peak performance. All this, and more adds up to a drive that can *provide* up to ten times the reliability of some competitive drives. And that's not just a claim, we guarantee it.

THE BEST NEWS OF ALL

Anybody can make incredible advertising claims, but it's when you get the drive home and start using it that you really find out how good it is, and how much the claims are worth. At Concorde, we don't think you should put up with wild promises and lots of headaches.

We guarantee our drives. We guarantee compatibility. Our C-221 series uses a licensed Atari DOS for maximum software compatibility. The disk operating system is included with every C-221M unit, in both the single and double density versions, at no extra cost.

We guarantee trouble free operation, not for 90 or 120 days like some manufacturers, but for one full year. And, in the unlikely event your Concorde drive should develop a problem, we don't ask you to go through the runaround of trying to get it repaired. Simply return it to your authorized Concorde dealer. Show him your receipt, and he'll simply exchange your drive – over the counter – with no hassles – at no charge.

HIGH PERFORMANCE AND SATISFACTION – NOT HIGH PRICE

After reading about the great new C-221 series Atari compatible drives from Concorde, you probably expect them to be high priced. But even with all these great features, and even with the great warranty, Concorde's C-221M Master is priced very competitively with other Atari compatible drives. And, the C-221S Slave units are priced even lower, for truly great values in additional storage capacity.

Check out the excitement. See your authorized Concorde dealer today, and experience the value of Concorde's C-221 series for yourself. Owning an Atari has never been so exciting!

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CONCORDE

UNLOCKING THE 56 GRAPHICS MODES

Instant exploration of Atari's display styles

by PAUL CHABOT

Why did you buy an Atari computer? The chances are good that, in addition to its other fine qualities, you were attracted by the unmatched ability to create computer color graphics.

Atari home computers are outstanding for graphics because they all feature, in addition to the 6502 central microprocessor, another chip called ANTIC (sound familiar?) that's dedicated solely to handling the Atari's video screen display.

The ANTIC chip can display data in 14 different formats, called *graphics modes*. The accompanying chart lists all 14, along with information about each. Some of these, such as Graphics 0, are text modes, which means that the data in memory must be represented as characters (numbers, letters, and symbols). Others, such as Graphics 7, tell the computer to display memory data as a picture.

In addition to the 14 ANTIC modes, there are three additional graphics modes that are controlled by yet another special chip, GTIA (George's Television Interface Adaptor). These are Graphics 9, 10, and 11. Here is what

SYNOPSIS

Introducing Atari's full range of graphics modes. With accompanying BASIC program that gives you instant display of all 56 modes. Runs on all Atari computers of all memory configurations. For Antic Disk subscribers: Type RUN "D:ALLMODES.BAS".

happens when you call up one of these GTIA modes in a program. The Atari first sets up a full screen display of Graphics 8, then alters memory location 623. If you call Graphics 9, then 64 is added to the contents of location 623. If you call Graphics 10, then 128 is added to this location. Calling Graphics 11 adds 192. The accompanying chart provides more details.

Thus, you see that GTIA has four states controlled by location 623, and accessible by the values 0, 64, 128, and 192. Each of ANTIC's 14 graphics modes can be altered by GTIA's four states — for a grand total of 56 modes. Of course, some of these modes are ugly and others are are simply useless. There are, however, many valuable modes.

The accompanying program sets up a sample text display, then allows you to view it in all 56 graphics modes. The display won't be recognizable in every graphics mode, but you'll get an instant demonstration of how the same data is interpreted in the different modes.

HOW TO USE THE PROGRAM

Type in the BASIC listing and test it with TYPO. SAVE an extra backup copy, then RUN it. It will produce a Graphics 2 screen display with a menu in the text window. Use the number keys [0]–[8] to change the display mode. Keys [A]–[E] produce additional modes that are supported directly by the XL series, but that require special programming to be used by 400/800 computers (see accompanying chart).

Press [G] to cycle GTIA through its four states. The [S] key changes the memory area that gets mapped to the screen. Feel free to roam around and watch your Atari think by typing in addresses such as 1536, 53760, 53960, 0,

continued on next page

and 40520. The [R] key gets you home again.

ALLMODES was created to demonstrate and explore the graphics capabilities of the Atari. Feel free to hit [BREAK] at any time and enter immediate-mode commands. For example, try POKEing various values directly into the color registers 704–712. If the GTIA isn't in its initial state, you'll have difficulty reading the text window. After using the immediate mode, type CONT [RETURN] to resume program execution. Typing [R] returns you to the menu.

SIZE CHANGES

Notice that besides changing the display, your selections cause the display area to shrink or expand. This is why it happens:

When you look at your video display, you're actually seeing a beam of electrons sweeping across the screen, left to right. Every time the beam reaches the right edge of the screen, it is turned off and moved down slightly, where it will sweep across the screen again. The result of each sweep on the screen is called a *scan line*. The standard Atari full-screen display holds 192 scan lines and is re-drawn every 1/60 of a second.

An Atari display combines scan lines into *mode lines*, units of one to 16 scan lines — depending on which graphics modes you're using.

Graphics 2, the mode we started with, has 10 mode lines. Each of its mode lines contains 16 scan lines, for a total of 160 scan lines, which results in a fairly full screen. ALLMODES retains this format of 10 mode lines when it displays any of the 56 graphics modes. However, a graphics mode might contain as few as one scan line per mode line.

For more information on how to control the Atari video display, see "Display Lists Simplified" (**Antic**, Feb/Mar 1983).

GTIA

When called from BASIC, GTIA modes 9,10, and 11 use a configuration similar to Graphics 8 and use the same amount of screen memory. Because of the difference in pixel shape, however, there are 80 pixels per row in GTIA. These three GTIA modes can be combined with the other modes by POKEing location 623 as follows:

GTIA 9 — POKE 623,64
GTIA 10 — POKE 623,128
GTIA 11 — POKE 623,192

COLOR ACCESS:

GTIA 9 — POKE hue into 712
Use BASIC COLOR command 0–15 for the shade.
GTIA 10 — POKE hues and intensities into 704–712
Use BASIC COLOR command 0–15 for the color.
GTIA 11 — POKE 712,0–14 for luminence. Use BASIC COLOR command 0–15 for hue.

NOTES:

* One color, two luminances
+User determined. Please see the article in this issue "ANTIC'S MODE 3."

Paul Chabot is a professor of mathematics and computer science at California State University in Los Angeles.

ATARI GRAPHICS MODES AND SCREEN FORMATS

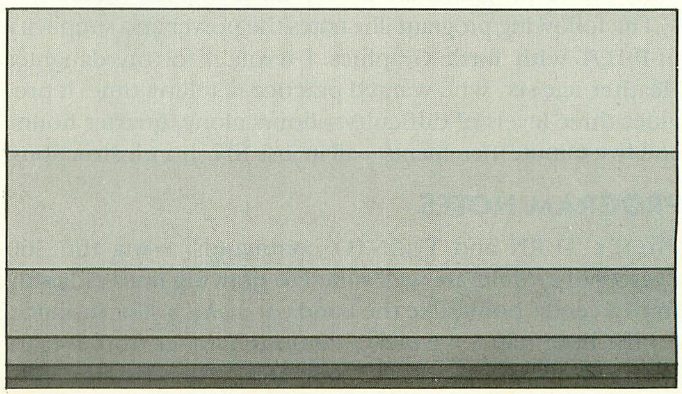
ANTIC MODE	BASIC MODE	MODE TYPE	BYTES/ LINE	COLUMNS	ROWS (SPLIT)	ROWS (FULL)	SCAN LINES/ MODE LINE	# OF COLORS	SCREEN RAM REQUIRED
2	GR.0	TEXT	40	40	—	24	8	1*	960
3	NONE	TEXT	40	40	—	+	10	1*	+
4	GR.12(XL)	TEXT	40	40	20	24	8	5	960
5	GR.13(XL)	TEXT	40	40	10	12	16	5	480
6	GR.1	TEXT	20	20	20	24	8	5	480
7	GR.2	TEXT	20	20	10	12	16	5	240
8	GR.3	GRAPH	10	40	20	24	8	4	240
9	GR.4	GRAPH	10	80	40	48	4	2	480
A	GR.5	GRAPH	20	80	40	48	4	4	960
B	GR.6	GRAPH	20	160	80	96	2	2	1920
C	GR.14(XL)	GRAPH	20	160	160	192	1	2	3840
D	GR.7	GRAPH	40	160	80	96	2	4	3840
E	GR.15(XL)	GRAPH	40	160	160	192	1	4	7680
F	GR.8	GRAPH	40	320	160	192	1	1*	7680

```
5 REM ALLMODES
6 REM BY PAUL CHABOT
7 REM ANTIC MAGAZINE
10 GOSUB 200
20 K=PEEK(764):IF K<64 THEN 40
30 FOR I=1536 TO 1575
32 POKE I,PEEK(53770):NEXT I
34 GOTO 20
40 POKE 764,255
50 REM LINKAGE
52 IF K=50 THEN M=2:GOSUB 100:REM ..0
54 IF K=31 THEN M=6:GOSUB 100:REM ..1
56 IF K=30 THEN M=7:GOSUB 100:REM ..2
58 IF K=26 THEN M=8:GOSUB 100:REM ..3
60 IF K=24 THEN M=9:GOSUB 100:REM ..4
62 IF K=29 THEN M=10:GOSUB 100:REM .5
64 IF K=27 THEN M=11:GOSUB 100:REM .6
66 IF K=51 THEN M=13:GOSUB 100:REM .7
68 IF K=53 THEN M=15:GOSUB 100:REM .8
70 IF K=63 THEN M=3:GOSUB 100:REM ..A
72 IF K=21 THEN M=4:GOSUB 100:REM ..B
74 IF K=18 THEN M=5:GOSUB 100:REM ..C
76 IF K=58 THEN M=12:GOSUB 100:REM .D
78 IF K=42 THEN M=14:GOSUB 100:REM .E
80 IF K=62 THEN GOSUB 120:REM ......S
82 IF K=40 THEN GOSUB 140:REM ......R
84 IF K=61 THEN GOSUB 150:REM ......G
90 GOTO 20
100 REM MODE CHANGE
102 POKE DL+3,64+M
104 FOR I=DL+6 TO DL+14
106 FOR W=0 TO 20:NEXT W
108 POKE I,M:NEXT I
110 RETURN
120 REM SCREEN AREA CHANGE
122 ? :? :? :? :POKE 656,0
124 ? "SCREEN AREA NOW BEGINS AT ";SA
126 ? :? "INPUT A NEW BEGIN ADDRESS"
128 INPUT SA
130 SH=INT(SA/256):SL=SA-256*SH
132 POKE DL+4,SL:POKE DL+5,SH
134 GOSUB 250:RETURN
140 REM RESTORE SCREEN
142 SL=PEEK(88):SH=PEEK(89)
143 POKE 623,0
144 SA=SL+256*SH
146 POKE DL+4,SL:POKE DL+5,SH
147 GOSUB 250
148 M=7:GOSUB 100:RETURN
150 REM GTIA MODES
152 I=PEEK(623)+64:POKE 712,48
154 IF I>255 THEN I=I-256
156 IF I>191 THEN POKE 712,8
158 POKE 623,I:RETURN
200 REM INITIALIZE
202 GRAPHICS 2
204 DL=PEEK(560)+256*PEEK(561)
206 SA=PEEK(88)+256*PEEK(89)
210 ? #6;"AAAAAAAAAAAAAAAAAA"
212 ? #6;"I      ****      r"
214 ? #6;"I  ++++++++++++  r"
216 ? #6;"I    allmodes    r"
218 ? #6;"I  ++++++++++++  r"
220 ? #6;"I      ****      r"
222 ? #6;"I       BY       r"
224 ? #6;"I  PAUL  CHABOT  r"
226 ? #6;"I      1983      r"
228 ? #6;"BBBBBBBBBBBBBBBBBB"
230 FOR I=0 TO 15:POKE 1616+I,I
232 POKE 1636+I,I:POKE 1656+I,I
234 POKE 1676+I,I:POKE 1696+I,17*I
236 POKE 1736+I,17*I:POKE 1756+I,I
238 NEXT I
240 POKE 712,48:POKE 704,12*16
242 POKE 705,6*16+6:POKE 706,15*16+4
244 POKE 707,166
250 REM MAIN MENU
252 ? :? :? :? :POKE 656,0:POKE 752,1
254 ? " 0  GR.0   A  Antic3   E  GR.7+
"
256 ? " 1  GR.1   B  Antic4   G  GTIA"
258 ? " 2  GR.2   C  Antic5   S  Scree
n Area"
260 ? " ...  etc.   D  GR.6+   R  Resto
re";
270 RETURN
```

TYPO TABLE

Variable checksum = 102215

Line num range	Code	Length
5 — 54	ZI	283
56 — 78	ZX	510
80 — 122	NL	290
124 — 147	BQ	299
148 — 212	KB	343
214 — 236	ZT	434
238 — 270	VM	382



TELLING TIME IN PILOT

Easy educational program —only 104 lines

SYNOPSIS

This is a simple and well-documented program to teach children to tell time using three levels of difficulty. Best of all, it's only 104 lines long and runs on all Atari computers. Antic Disk subscribers simply LOAD D:TIME.PLT [RETURN]. Now type RUN.

by RICHARD SELTZER

In "Turtle Sketch Pad" in the December 1983 **Antic**, it was interesting to see how to use PEEK and POKE-type commands in PILOT to get results similar to programs written in BASIC.

But the real power and value of PILOT comes from its simplicity. Programs that stick to PILOT (without all the PEEKs and POKEs) can be written and rejuggled right at the keyboard and can be understood at a glance.

In other words, for question and answer kinds of drills and exercises, teachers or parents can write programs in PILOT as easily as they might prepare worksheets or handouts. PILOT programs are a very do-it-yourself medium.

The following program illustrates the power and simplicity of PILOT with Turtle Graphics. I wrote it for my daughter Heather, age six, who wanted practice in telling time. It provides three levels of difficulty—hours alone, quarter hours, and five minute increments—all in just 104 short instructions.

PROGRAM NOTES

PILOT's TURN and TURNTO commands, using the 360 degrees of a circle, are well suited to drawing lines radiating from a center point, like the hands of a clock. For instance, for the hour hand, we pick a random number from 0 to 11 (line 170), set 0 equal to 12 (line 180). Then (in line 200) we go to the center of the screen (0,0), and from the straight up position (TURNTO 0 in line 190) turn 30 degrees times the number of the hour and draw a line 15 units long (just a bit shorter than the minute hand, which we arbitrarily made 20 units long in line 190),

For the Quarter Hour version, we add an extra line (line 390) so the hour hand realistically moves ahead a quarter of 30 degrees (or 15/2) for each quarter hour beyond the hour. Similarly for the five minute version (line 590), the hour hand moves ahead a twelfth of 30 degrees (5/2) for each five minute increment beyond the hour.

Using the clock hands alone, without the numbers, made the games more interesting to play and also greatly simplified the programming.

Variables:

#H = the hour, a random number from 0 to 11
#Q = the quarter hour, a random number from 0 to 3
#M = the five minute increment, a random number from 0 to 11

continued on page 18

TELLING TIME IN PILOT continued from page 16

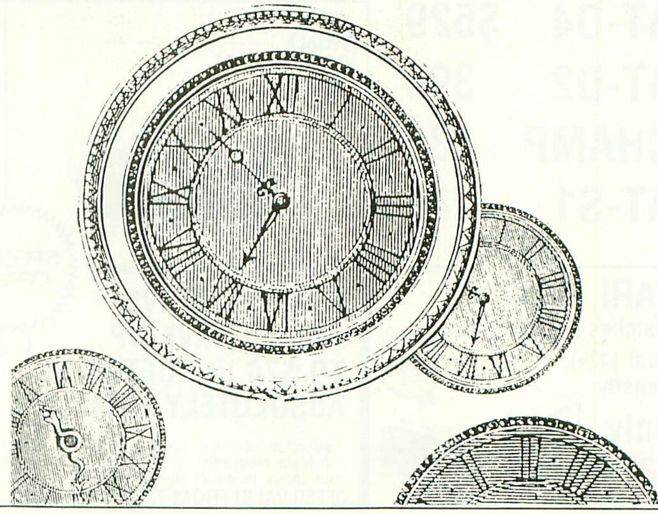
#N = the quarter or the five minute increment translated to minutes
#R = the number of questions answered right
#T = the number of questions asked (a game is 12 questions)

In the five minute version, if the correct answer was 5:05, with the standard format of #H:#M the program would expect an answer of 5:5. So in line 660, we add a match of #H:05, so the right answer is recognized as right. Also, when the answer is an exact hour, the natural inclination is to type just the number of the hour, without a colon and zeroes. Lines 460 and 670 make sure that that, too, will be accepted as a match.

Richard Seltzer is the author of two children's books, The Lizard of Oz *and* Now and Then and Other Tales from Ome. *He lives in West Roxbury, Mass.*

```
10 T:WHAT'S YOUR NAME?
20 A:$NAME
30 GR:CLEAR
40 *CIRCLE
50 GR:PEN RED;GOTO 0,0;TURNTO #X;GO 25
60 C:#X=#X+1
70 J(#X<>360):*CIRCLE
80 *START
90 C:#R=0
100 C:#T=0
110 T:DO YOU WANT TO PLAY HOURS (H), Q
UARTER HOURS (Q) OR FIVE MINUTES (M)?
(TYPE H,Q, OR M)
120 A:
130 M:H,Q,M
140 JM:*HOUR,*QUARTER,*MINUTE
150 JN:*START
160 *HOUR
170 C:#H=?\12
180 C(#H=0):#H=12
190 GR:GOTO 0,0;TURNTO 0;PEN YELLOW;DR
AW 20
200 GR:GOTO 0,0;TURNTO #H*30;DRAW 15
210 GR:PEN RED;GOTO 0,0
220 T:
230 T:WHAT TIME IS IT, $NAME? (JUST TY
PE THE HOUR)
240 A:
250 M:#H
260 C:#T=#T+1
270 TN:NO, IT'S REALLY #H. GOOD LUCK O
N THE NEXT ONE, $NAME.
280 PAN:150
290 UY:*RIGHT
300 GR:GOTO 0,0;TURNTO #H*30;PEN ERASE
;DRAW 15
310 J(#T<12):*HOUR
320 GR(#T=12):GOTO 0,0;TURNTO 0;PEN ER
ASE;DRAW 20
330 J(#T=12):*REPLAY
340 *QUARTER
350 C:#H=?\12
360 C(#H=0):#H=12
370 C:#Q=?\4
380 C:#N=15*#Q
390 GR:GOTO 0,0;TURNTO #H*30;TURN #Q*(
15/2);PEN YELLOW;DRAW 15
400 GR:GOTO 0,0;TURNTO #Q*90;DRAW 20
410 GR:PEN RED;GOTO 0,0
420 T:
430 T:WHAT TIME IS IT, $NAME? (USE THE
 FORM 9:15, 10:30, ETC.)
440 A:
450 M:#H:#N
460 M(#Q=0):#H
470 C:#T=#T+1
480 UY:*RIGHT
490 UN:*ANSWER
500 GR:GOTO 0,0;TURNTO #H*30;TURN #Q*(
15/2);PEN ERASE;DRAW 15
510 GR:GOTO 0,0;TURNTO #Q*90;DRAW 20
520 J(#T<12):*QUARTER
530 J(#T=12):*REPLAY
540 *MINUTE
550 C:#H=?\12
560 C(#H=0):#H=12
570 C:#M=?\12
580 C:#N=#M*5
590 GR:GOTO 0,0;TURNTO #H*30;TURN #M*(
5/2);PEN YELLOW;DRAW 15
600 GR:GOTO 0,0;TURNTO #M*30;DRAW 20
610 GR:PEN RED;GOTO 0,0
620 T:
630 T:WHAT TIME IS IT, $NAME? (USE THE
 FORM 5:25, 12:05, ETC.)
640 A:
650 M:#H:#N
660 M(#N=5):#H:05
670 M(#N=0):#H
680 C:#T=#T+1
690 UY:*RIGHT
700 UN:*ANSWER
710 GR:GOTO 0,0;TURNTO #H*30;TURN #M*(
5/2);PEN ERASE;DRAW 15
720 GR:GOTO 0,0;TURNTO #M*30;DRAW 20
730 J(#T<12):*MINUTE
740 J(#T=12):*REPLAY
750 *RIGHT
760 T:RIGHT!
770 C:#R=#R+1
780 SO:13
790 PA:15
800 SO:17
```

```
81Ø PA:15
82Ø SO:2Ø
83Ø PA:15
84Ø SO:25
85Ø PA:3Ø
86Ø SO:Ø
87Ø E:
88Ø *ANSWER
89Ø T(#N=Ø):NO, IT'S #H:ØØ. GOOD LUCK
ON THE NEXT ONE, $NAME.
9ØØ PA(#N=Ø):15Ø
91Ø E(#N=Ø):
92Ø T(#N=5):NO, IT'S #H:Ø5. GOOD LUCK
ON THE NEXT ONE, $NAME.
93Ø T(#N<>5):NO, IT'S #H:#N. GOOD LUCK
 ON THE NEXT ONE, $NAME.
94Ø PA:15Ø
95Ø E:
96Ø *REPLAY
97Ø T:VERY GOOD, $NAME. OUT OF 12, YOU
 GOT #R RIGHT. WANT TO PLAY SOME MORE?
98Ø A:
99Ø M:Y,YES
1ØØØ JM:*START
1Ø1Ø JN:*END
1Ø2Ø *END
1Ø3Ø T:GOODBYE, $NAME.
1Ø4Ø E:
```



NETWORKING NEWS

Reach out and download a BBS

by MICHAEL CIRAOLO

ATARI'S OWN BOARD FOR USERS GROUPS

Atari, Inc. operates a 24-hour bulletin board system (BBS) for users groups. The system gives user group officers with valid sign-ons total access, including 46 minutes of connect time and the ability to leave messages. Individuals without valid sign-ons can read mail, but can't leave messages. They are also limited to 15 minutes.

The BBS currently offers educational public domain software, according to system operator (sysop) Cassie Stahl. In the future, the board is likely to expand to include demonstrations of new products for downloading, as well as information about new Atari products.

This system uses an Atari 800, a 6 megabyte hard disk drive, a 300 baud Hayes Smartmodem, Atari 850 interface and 822 printer. The system runs with FOREM, a popular Atari bulletin board program that allows users to obtain limited access to the system without a password.

Sysop Stahl says she is available for chatting on this system during normal working hours, Pacific time. **(408) 745-4263**.

GRAPHIC TELECOMMUNICATIONS

There is no reason to limit your Atari's telecommunication capabilities to downloading or uploading text files and programs. If you have ever drawn a picture on your Atari, you can send your picture file to a friend using a modem and the correct software.

Use AMODEM, a terminal program published in **Antic** in July, 1984 (Everybody Needs AMODEM, page 21) to transmit picture files. You must be transmitting to a person who is also using AMODEM. Your friend must also have the same graphics program, you used to create your picture; without the same program, your friend will not be able to read the file you transmit. With the matching graphics software, your friend can read the file immediately.

Data sent over the phone lines can be garbled, improperly received or lost for various reasons. If the picture file your friend receives isn't identical, byte for byte, to the file you sent, the new file may not load. AMODEM has the ability to transmit files without losing or adding any extra bytes. This feature, called XMODEM protocol, requires that both the sending and receiving computers be running a terminal with XMODEM. The person transmitting should use the Upload feature, and the receiving person should use Receive.

UPDATE

Here are several new Atari Bulletin Board Systems, plus a few old ones with new numbers.

California
Atari Users Group BBS 24 hours
(408) 745-4263
Modem Magazine 24 hours
(408) 289-8217

Canada
Atari Starship
(416) 622-7275

Illinois
Atari World
(312) 776-8173
Courtyard 24 hours
(312) 668-6272
Phamis 24 hours
(312) 448-6472
Valley Girl BBS 24 hours
(312) 747-4247

Indiana
Alien II Evening only
(219) 769-9025

New York
Action BBS
(716) 235-3394

Texas
Atari the Great 24 hours
(512) 578-8033

NEW DIRECTIONS

Public Access Bulletin Board Systems are known as great sources of public domain software, of news and mail from fellow computer users, and of several varieties of games.

There are a few BBS's, however, which differ from the run-of-the-mill system, offering callers access to information not widely available on low-cost or no-cost telecommunication systems.

continued on next page

One such system is the Modem Magazine, operated by Bob and Cassie Stahl. (It's a bus driver's holiday for Cassie, the professional sysop of Atari's users group BBS.) This was the first system to be listed in the San Jose, California, phone book, challenging the phone company to start a new category.

Modem Magazine currently offers about 264K worth of text on a variety of subjects not normally found on a BBS, including agriculture and the original Jethro Tull, space, robotics, lasers, the environment, rhinoceros extinction, and computing in the Soviet Union.

Sysop Bob Stahl said he also hopes to move his 24-hour BBS in a more political direction, encouraging debate on the impending presidential election.

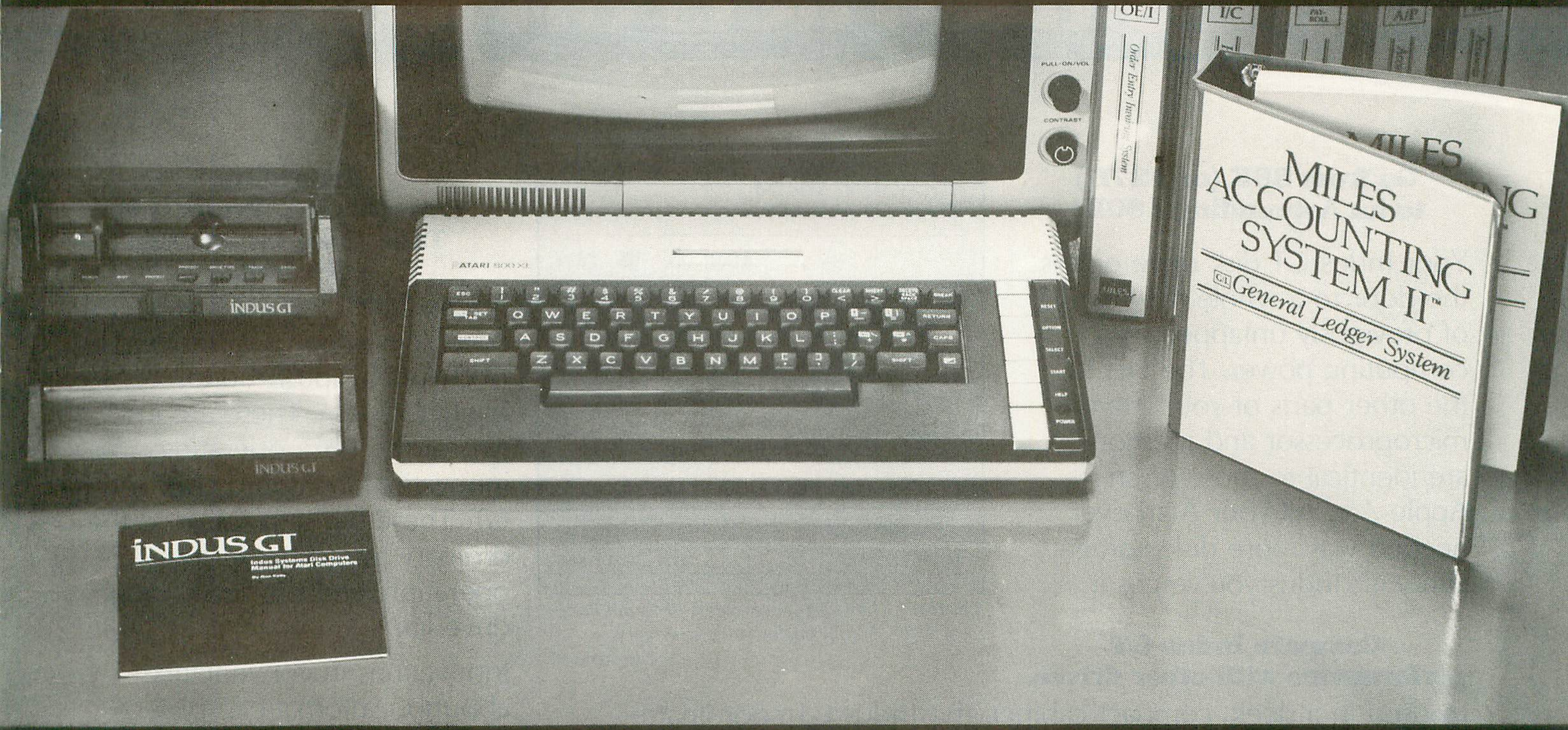
Stahl, who is looking for an older audience, said interest in his system is picking up; Modem Magazine gets between 50 and 100 calls each week, with a decline in the summer. The text files are slowly being discovered by callers, and a few people are systematically reading their way through the entire three disks of material.

In a more conventional vein, the Stahls will be bringing Avalon Hill board games to their system, with one person appointed judge and the multiple users normally found in such games.

The Stahl's system uses an Atari 800, an Atari 400 with 48K and eight Atari 810 disk drives. With an ATR 8000, the system may soon have C/PM capability. Modem Magazine uses two printers, the Atari 822 and 825, and a Hayes Smartmodem at 300 and 1200 baud.

The system, previously free to the public, now requires a $12 per year fee. There is still limited public access, but the fee allows total access to the system. The fee is used to cover equipment costs. **(408) 289-8217**. ▲

ANNOUNCING A MAJOR BREAKTHROUGH FOR ATARI COMPUTERS:



The Superbly Engineered Indus GT™ Disk Drive *The Critically Acclaimed Miles Accounting System II™*

PLUG-IN BUSINESS/ ACCOUNTING POWER.

These state-of-the-art components
transform *any* Atari computer
into a powerful, productive business system.

Here's the Facts on just how

Go from 88K (or 127K) to an Astounding 180K!

Your Indus GT disk drive opens the door to a whole new world of previously untapped computing power. The fact is, the other parts of your Atari, microprocessor and memory, are identical to those of an Apple //e. All your Atari ever needed was more disk storage... and with Indus you've *got* it.

EQUIVALENT SYSTEM PRICE COMPARISONS:

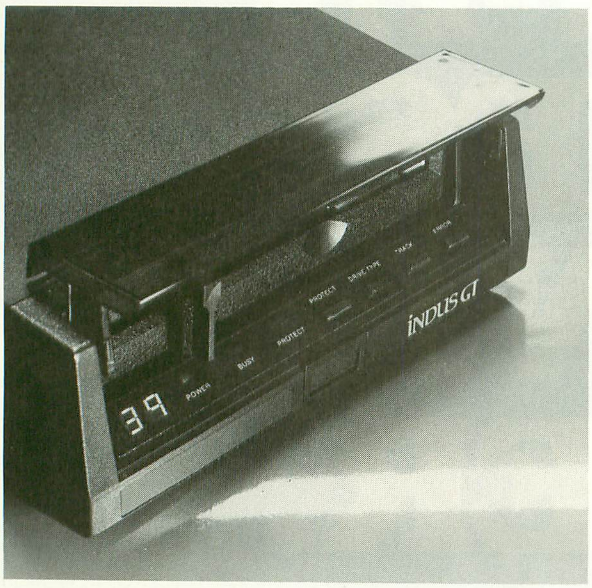
	ATARI 800XL	Apple //e	IBM PC
Computer w/64K and 2 Disk Drives	1297	2445	2633
Monitor with Interface and Cable	121	incl	680
Printer Interface and Cable	134	120	205
Printer	449	449	595
TOTAL HARDWARE	**1991**	**3014**	**4113**
General Ledger	145	395	595
Accounts Receivable	145	395	595
Accounts Payable	145	395	595
Payroll	FREE!	395	595
TOTAL SOFTWARE	**435**	**1590**	**2380**
TOTAL PACKAGE	**2426**	**4594**	**6493**

Based on Manufactuers Suggested Retail Price as of 4/84. Actual dealer price may vary.

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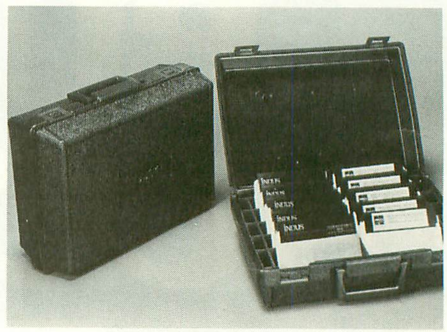
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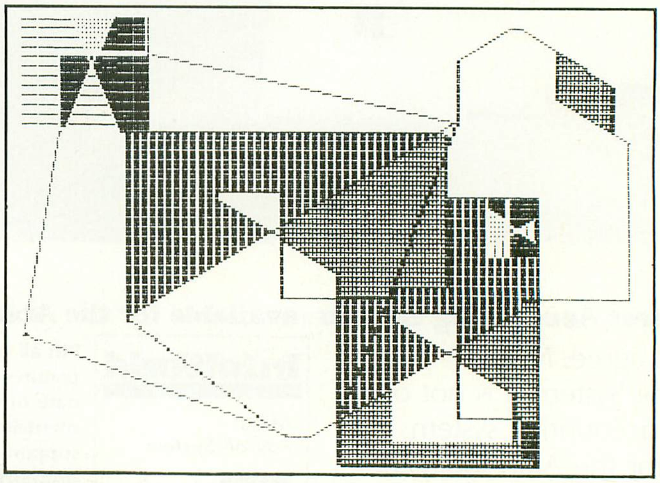
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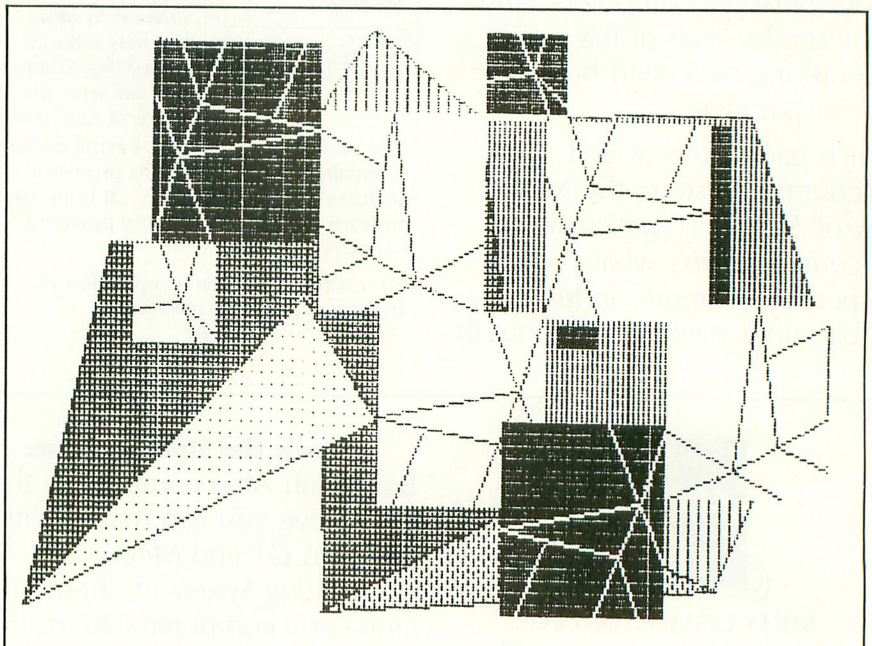
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ATARI ART

Modern art on a dot matrix printer

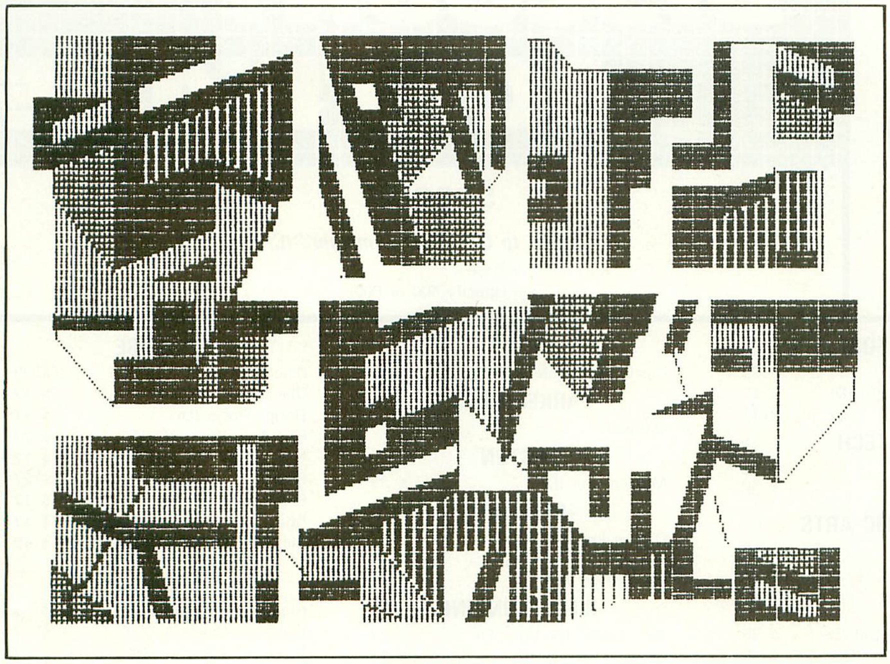
by JOSEPHA HAVEMAN

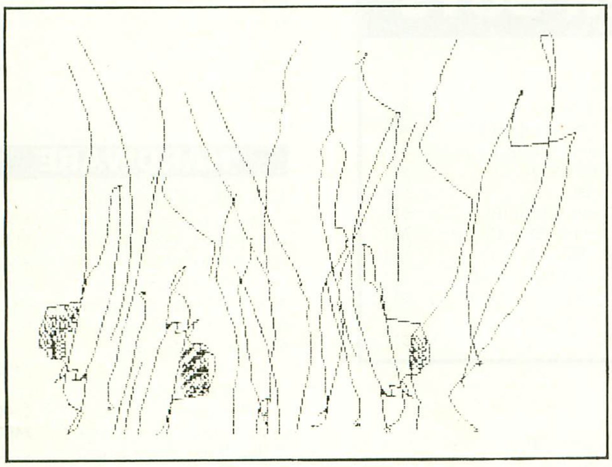


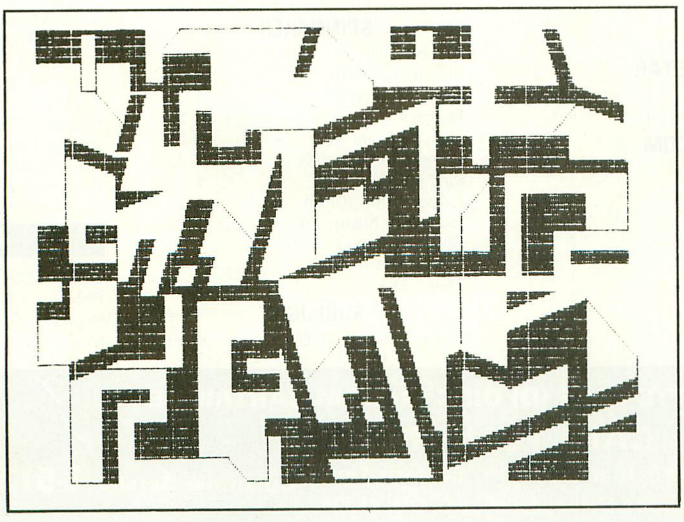


Computer art is usually identified with video screen displays. But dot matrix printers and color plotters can be effectively used by artists to produce computer generated pictures on paper. Unfortunately, only a few graphics software packages offer a built-in screen dump utility which would allow the artist to send the image currently on the screen directly to a printer. But if your favorite graphics program does not include this very important option, you can usually save the finished image to disk—from which the pictures can then be loaded into another program for dumping to a printer.

Because each graphics software package offers different drawing and painting features, many computer artists have several graphics programs around to provide a variety of features. Most high resolution Atari graphics programs allow only 4 colors on the screen at one time. Some programs offer the use of texture patterns, which provides an additional variety of picture options.







TEXTURE IN HARD COPY

For hard copy printout the texture patterns provide greater variety on paper than different screen colors do. An interesting problem here, is to compose pictures with the computer, viewed and edited on the CRT, while trying to predict how the printer will interpret each color, line and texture element. To accurately predict the effect takes considerable practice.

The best way to get to know these variations, is to create a test print for each software package and printer. Colors may print out with the same or similar textures in a black & white picture, making adjacent areas indistinguishable from one another. Suitable textures, rather than colors, must be programmed in such areas.

To get the most out of your Atari and your graphics printer, work with several compatible programs, using each for their best, or unique, features.

With the right programming and careful study and testing, excellent prints can be produced on dot matrix printers. True to its origin, this art bears the mechanical look of the medium in which it is produced. However, with the proper control of the printer's capabilities, a high quality can be maintained in the work. And these stylistic features become merely representative of the techniques of our era, not too different from those of medieval woodcuts 500 years ago.

Creative tools change with the times, as do the superficial appearances of artworks. The essence of art, however, remains pretty much the same.

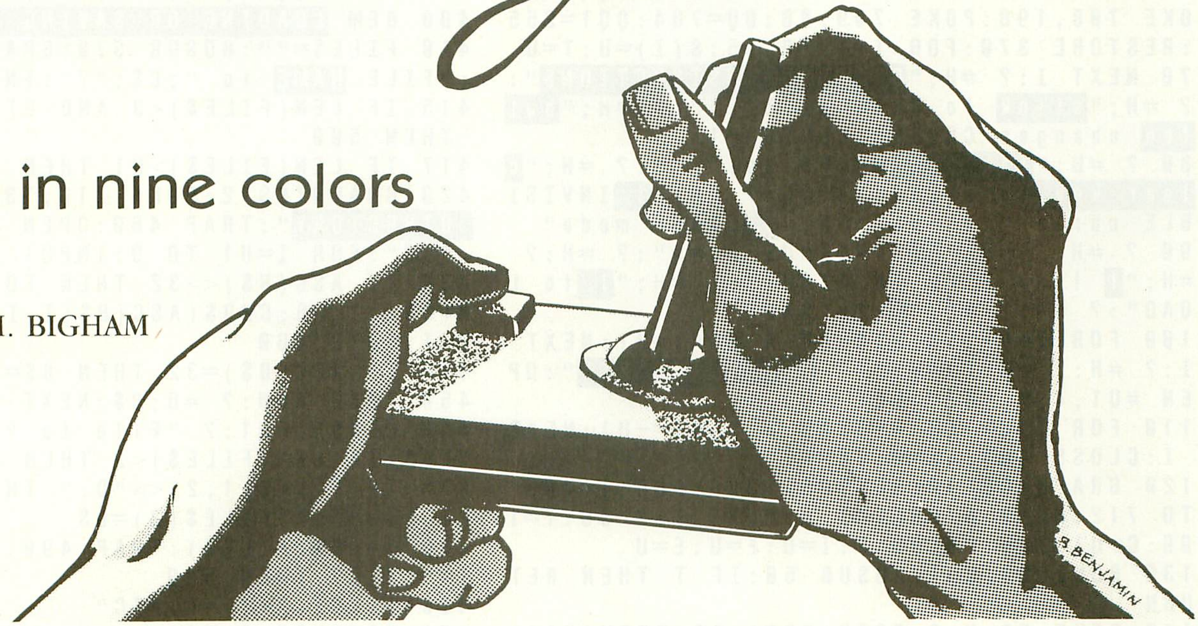
Berkeley computer artist and photographer Josepha Haveman is an associate professor at California College of Arts and Crafts. She holds an Atari Fellowship Grant and this April exhibited computer prints at the Cory Gallery in San Francisco.

The pictures shown here were created on an Atari 800 and printed with a Gemini 15X. The artist uses the following compatible software at various stages of drawing and dumping an image: Micro Illustrator on KoalaPad, Micro-Painter and Graphic Master.

Drawing Fun

Sketch in nine colors

by ELRHEA M. BIGHAM



This Graphics 10 drawing program requires that your computer have the GTIA chip, which is likely if you purchased it after Jan. 1982. If you're in doubt, type in and RUN the following:

```
10 GRAPHICS 10
20 GOTO 20
```

If the screen turns black, you have the GTIA chip. If the screen stays blue, you must have one installed by a service representative to use this program.

Type in the program and SAVE a couple of copies for backup. Check it with TYPO, make any necessary corrections, plug in a joystick, and RUN it.

When the program starts, a screen of instructions appears. You can return to this screen at any time by pressing [CLEAR], but this also erases your picture. Press any key to start drawing. You can change the current drawing color by pressing the joystick button. Activate other commands with the following keys:

[I] — moves the cursor without drawing. Press the joystick fire button to start drawing again.

SYNOPSIS

Drawing Fun is a joystick drawing program that uses Graphics 10, a nine-color medium-resolution GTIA mode. The program requires BASIC and a joystick, and can use disk or cassette for storage. It runs on all Atari computers manufactured after Jan. 1982. The fill feature works somewhat differently with XL computers (sometimes fills left and right instead of right only). If this proves to be a problem, use Translator. Antic Disk Subscribers: Run "D:DRAWFUN.BAS."

[CLEAR] — erases the screen and returns to the menu of instructions.

[E] makes cursor an eraser. Press the fire button to return to drawing mode.

[TAB] — creates a special effect by rotating all eight colors through the Atari's color registers, something like a circular bucket brigade. Press [TAB] again to stop the effect and return all colors to their original state.

[C] — when you press this, the computer will automatically continue all moves you initiate with the joystick—drawing is continuous. Press [C] again to stop the automatic drawing.

[F] — fills to the right. This function fills one line at a time to the right of the cursor. This works only over the background color (black). Press [F] again to turn the fill off.

[S] — save a drawing. First you're prompted for a file name. If you're using a disk, type in the full name, including "D1:". The program appends the extender ".PIC." If you just press [RETURN], the program displays the current disk directory. Cassette users, type C:, then press [RETURN].

[L] — load a saved drawing. This works similarly to Save, above. You needn't type in the .PIC extender when loading a file.

NOTE: When you enter the Save or Load section, the current picture is erased. You must reload it to continue working on it. If you activate one of these, but decide not to use it, type in at least two characters, beginning with a number. You'll be returned to the screen of instructions.

continued on next page

```
10 REM DRAWING FUN
20 REM BY ELRHEA M. BIGHAM
30 REM ANTIC MAGAZINE
40 DIM C$(4),CIO$(7),FILE$(20),B$(17),C1$(30),S(35):C1$="h▀♥,A▌=B▌↓A▌h◆◢♣u▀H▌●AAAAAA":H=6:U1=1:U16=16
50 POKE 16,112:POKE 53774,112:IF DA THEN RETURN :REM DISABLE BREAK KEY
60 GRAPHICS 17:DA=1:H=6:POKE 710,134:POKE 708,198:POKE 709,88:QQ=764:QQ1=255:RESTORE 370:FOR I=1 TO 35:S(I)=U:T=U
70 NEXT I:? #H;"DRAWING INSTRUCTIONS":? #H;"stick to DRAW with   ":? #H;"button changes COLOR":CLOSE #1
80 ? #H;"tab key MOVES color ":? #H;"clear key to CLEAR":? #H:? #H;"i INVISIBLE cursor":? #H:? #H;"e ERASE mode"
90 ? #H:? #H;"c CONTINUE move":? #H:? #H;"f line FILL to RIGHT":? #H;"l to LOAD":? #H:? #H;"s to SAVE"
100 FOR I=U1 TO H:READ A:S(A)=U1:NEXT I:? #H:? #H:? #H;"    PRESS ANY KEY":OPEN #U1,4,U,"K:":GET #U1,I
110 FOR I=U1 TO H:READ A:S(A)=-U1:NEXT I:CLOSE #U1:AL=U:SG=U1
120 GRAPHICS 10:RESTORE 390:FOR I=705 TO 712:READ A:POKE I,A:NEXT I:X=38:Y=100:C=U1:Z=U:COLOR C:I=U:F=U:E=U
130 POKE QQ,QQ1:GOSUB 50:IF T THEN RETURN
140 POKE 77,U:S=PEEK(632):SG=PEEK(644):IF AL AND S=15 THEN S=AL:SG=R
150 IF AL AND S<>15 THEN AL=S:R=SG
160 Q=S(S):H=S(S+20):X=X+Q*((X<79 AND Q=U1) OR (X>U AND Q=-U1)):Y=Y+H*((Y<184 AND H=U1) OR (Y>U AND H=-U1))
170 IF E THEN LOCATE X,Y,C:COLOR U1:PLOT X,Y
180 IF SG=U THEN C=U1+C*(C<9):E=U:COLOR C:IF I=U1 THEN I=U:C=B
190 IF I=U1 THEN PLOT X,Y:COLOR U1:PLOT X,Y:GOTO 220
200 IF F THEN TRAP 200:POSITION X,Y:POKE 765,C:XIO 18,#6,12,0,"S:"
210 PLOT X,Y:COLOR U:PLOT X,Y:IF Z THEN Y1=USR(ADR(C1$))
220 COLOR C:PLOT X,Y:A=PEEK(QQ):IF A=QQ1 THEN 140
230 POKE QQ,QQ1:IF A=44 AND Z=U THEN Z=U1:A=QQ1
240 IF A=44 AND Z THEN Z=U:RESTORE 390:FOR I=705 TO 712:READ J:POKE I,J:NEXT I
250 IF A=13 THEN E=U1:F=U:I=U
260 IF A=0 THEN C$="load":GOTO 410
270 IF A=62 THEN C$="save":GOTO 410
280 IF A=56 AND F=U1 THEN F=U:A=QQ1
290 IF A=56 AND F=U THEN F=U1:E=U:I=U
300 IF A=42 THEN I=U1:E=U:F=U:B=C:C=U
310 IF A=54 OR A=118 THEN 60
320 IF A=18 AND AL THEN A=QQ1:AL=U:R=U1
330 IF A=18 THEN AL=S:R=SG
340 PLOT X,Y:COLOR U:PLOT X,Y:IF Z THEN Y1=USR(ADR(C1$))
350 COLOR C:PLOT X,Y:GOTO 140
360 REM JOYSTICK MOVE DATA
370 DATA 5,6,7,25,29,33,9,10,11,26,30,34
380 REM GRAPHIC 10 COLOR DATA
390 DATA 6,36,70,102,132,166,226,42
400 REM LOADING OR SAVING A DRAWING
410 FILE$="":GOSUB 570:GRAPHICS 2:? #6;"FILE NAME to ";C$;"?":INPUT FILE$
415 IF LEN(FILE$)<3 AND FILE$(1,1)="C" THEN 500
417 IF LEN(FILE$)>U1 THEN 470
420 GRAPHICS 2:POKE 710,130:? #6;"FILE DIRECTORY":TRAP 460:OPEN #U1,6,U,"D:*.PIC":FOR I=U1 TO 9:INPUT #U1,B$
430 IF ASC(B$)<>32 THEN FOR I=U1 TO LEN(B$):? #6;CHR$(ASC(B$(I,I))+128);:NEXT I:GOTO 460
440 IF ASC(B$)=32 THEN B$=B$(2)
450 TRAP 460:? #6;B$:NEXT I
460 CLOSE #U1:? "File to ";C$;:INPUT FILE$:IF LEN(FILE$)<2 THEN 420
470 IF FILE$(1,2)<>"D:" THEN B$=FILE$:FILE$="D:":FILE$(3)=B$
480 A=LEN(FILE$):TRAP 490:IF FILE$(A-3)=".PIC" THEN 500
490 FILE$(A+1)=".PIC"
500 TRAP 60:CLOSE #2:IF C$="save" THEN I=8:CMD=11:POKE 559,0:GOSUB 520:POKE 559,34:GOTO 120
510 CMD=7:T=1:GOSUB 120:I=4:GOSUB 520:GOTO 140
520 OPEN #2,I,128,FILE$
530 J=STADR:GOSUB 560:POKE 868,B:POKE 869,A:J=BYTES:GOSUB 560:POKE 872,B:POKE 873,A
540 POKE 866,CMD:ERROR=USR(ADR(CIO$),32)
550 ERROR=PEEK(867):CLOSE #2:RETURN
560 A=INT(J/256):B=INT(J-A*256):RETURN

570 POKE 764,255:CIO$="hhh⌧LVd":BYTES=7400:STADR=PEEK(88)+256*PEEK(89):RETURN
```

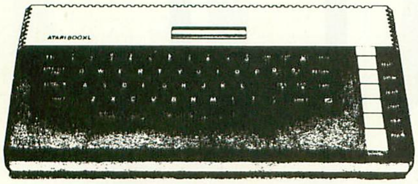
TYPO TABLE

Variable checksum = 621365

Line num range	Code	Length
10 – 70	OK	532
80 – 140	PP	563
150 – 250	HN	532
260 – 370	LP	399
380 – 460	DI	533
470 – 560	QY	538
570 – 570	QD	84

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ANTIC'S MODE 3

A special character mode

by KARL WIEGERS

With the implementation of the new Operating System in the XL series of Atari computers, all of Atari's graphics and text modes but one are readily available to the user from BASIC. This is ANTIC Mode 3, a text mode that's similar to Graphics 0, but that allows special modifications to the character set.

> **SYNOPSIS**
>
> *Here's how to modify Atari's text mode to display video lowercase letters with real descenders (g, j, p, q, and y), and subscripts. The programs run on all Atari computers. Please note: the ANTIC referred to in this article is Atari's LSI chip, not your favorite magazine. Newer readers now know where our name came from. Antic Disk Subscribers: Run "D:HIDDEN.BAS"*

A few of the concepts and terms used in this article may be unfamiliar to you. The *display list* is a set of instructions used by the ANTIC chip, the special graphics processor that constructs the screen display. See "Display Lists Simplified" (**Antic**, February/March 1983) for a detailed explanation of display lists and how they work.

A *scan line* is a single horizontal line traced by the electron beam on your television screen. Every 30th of a second, 525 scan lines are produced, forming a single screen image.

A *mode line* in Atari terminology is a group of scan lines (from 1 to 16, depending on the graphics mode) used as a unit by the display list. For instance, in Graphics 0, eight scan lines make up one mode line. See the Graphics Chart ("Unlocking the 56 Graphics Modes") in this issue for the number of scan lines required by different text and graphics modes.

Character graphics refers to the method normally used by the Atari Operating System to display alphanumeric characters on the screen. Read "Character Graphics" (**Antic**, February 1984) for further information.

Each character is composed of dots (pixels) in an 8-by-8 matrix. The dot pattern for each character is stored in eight consecutive bytes in ROM. The 128 characters that are the Atari character set occupy (128×8) 1024 bytes.

Here's a short program that will print out the Internal Character set (the ATASCII set).

The order in which the set is printed is the same order in which the computer's Read Only Memory stores the set.

```
10 PRINT "NUMBER",,"CHARACTER"
20 FOR I=0 TO 63:PRINT
   I,,CHR$(I+32):NEXT I
30 FOR I=64 TO 90:PRINT
   I,,CHR$(I-64):NEXT I
35 FOR I=91 TO 95:PRINT
   I,,CHR$(27);CHR$(I-64):NEXT I
40 FOR I=96 TO 124:PRINT
   I,,CHR$(I):NEXT I
50 FOR I=125 TO 127:PRINT
   I,,CHR$(27);CHR$(I):NEXT I
```

In ANTIC 3, each mode line is ten scan lines high. Each character is still represented by eight bytes, and two scan lines normally appear as blanks below the character. Second, the last 32 characters in the set (lower case letters plus six special important characters) are displayed differently from the rest. The first two bytes of these 32 characters are displayed at the *bottom* of the character, and the two blank lines appear at the top. This allows us to redefine some of these characters to have lower-case descenders (the "tails" of letters, g, j, p, q, y extend two dots below the bottom of other letters).

STEP BY STEP

First, modify the display list. Each mode line of ANTIC 3 has ten scan lines. Our ANTIC 3 screen will have 20 lines of text on the screen. The program in Listing 1 sets up the ANTIC 3 display list.

When you RUN Listing 1, the screen will flash and a rectangular cursor will appear. The Operating System is set up for ANTIC 2, so it tries to display 24 lines. Since we've set up our new display

list to show 30 lines, the bottom four lines of the display are invisible. Press [RESET] to return to the normal display before rerunning the program.

Type some letters. Capital letters, numbers and graphic symbols look fine. Now type some lowercase letters. All the tall lowercase letters (b, d, f, h, i, j, k, l, t) are cut off; the tops of the letters are displayed as dots at the bottom of the letters. Here's why:

Figure 1A shows the dot pattern for a normal uppercase 'Y' in ANTIC Mode 2. Figure 1B shows the 'Y' in ANTIC 3. The two extra scan lines appear as blank lines below the character. Figure 2A shows the pattern for a lowercase 't', and 2B shows its ANTIC 3 representation. Note that dots in the top two rows of the normal character have been moved to the bottom of the character in ANTIC 3. This happens with all characters with ATASCII codes between 96 and 127.

We can't use the standard character set in ANTIC 3 because of this. One possible solution is to redraw each character one line lower within its 8-by-10 matrix. The entire set must be copied into RAM first.

Figure 3 illustrates the necessary steps. Shift the eight bytes in the character down by one, and move the last byte to the top of the character. When ANTIC 3 displays the character, it displays the first two bytes last, so the vertically shifted characters will look fine. Listing 2 contains a machine-language subroutine that transfers the character set to RAM and performs the modification quickly. Merge Listing 2 with Listing 1 to combine the ANTIC 3 display list with the shifted characters.

Here's how to merge the two listings:

1. LOAD or type in Listing 1 and LIST it to disk or cassette.
2. Verify with TYPO.
2. LOAD or type in Listing 2.
3. Use the ENTER command to load (and merge) Listing 1.
4. Use SAVE to store the combined program.
5. If you don't see 'READY' after running the combined program, press [RESET] and RUN again.

We're now ready to redefine some characters to give the lowercase descenders mentioned earlier. We can repair the comma and the semicolon at the same time.

Make a less squashed-looking 'y' by changing it to the dot pattern in figures 4A and 4B. This illustrates lowercase descenders; ANTIC 3 gives such characters a more pleasing appearance than does the usual text mode.

Listing 3 gives descenders to all the appropriate characters, and repairs the comma and semicolon. Merge this with the program from Listings 1 and 2. You now have a complete, working text display for ANTIC Mode 3.

A USEFUL APPLICATION

If we wish to write chemical or mathematical formulae, we need to use symbols as subscripts. Let's use ANTIC 3's special display features to create some subscript number characters.

The ATASCII character set has six rarely used characters whose codes are: 96 ([CTRL][.];123([CTRL][;]; 124 ([SHIFT][=]); 125; 126; and 127. In this example, we'll replace character 96 with the dot pattern for a subscript '2', 123 with subscript '3', and 124 with subscript '4' (Figures 5A and 5B). Type in Listing 4 and merge with your evolving program. Press [RESET], and RUN the program. Now, whenever you press [CTRL][–], you should get a subscript '2', and so on. Try writing the chemical formula for potassium phosphate with these keystrokes:

[K] [CTRL][;] [P] [O] [SHIFT][=]

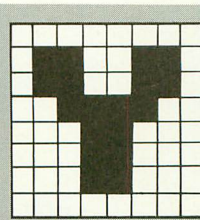
See if you can type other formulae, like silver carbonate, Ag_2CO_3; sodium acetate, $NaC_2H_3O_2$; aluminum sulfate, $Al_2(SO_4)_3$. This may be the first chemistry you've seen coming out of your Atari computer, but it's just one application of ANTIC Mode 3. (If you come up with any other interesting uses for this mode, send then to Antic. If they're good, we'll publish them.)

As always, this is just a start. ANTIC 3 can be used for super/subscripts, footnotes, and vowel markings for foreign languages. Special character sets can be printed out using screen dump programs.

Karl E. Wiegers, Ph.D., is a research chemist for Eastman Kodak and an Atari hobbyist. He writes for a number of computer publications.

continued on next page

figure 1A



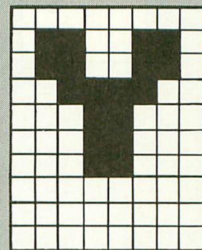
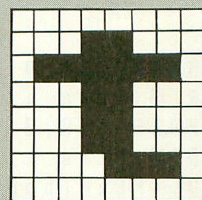


figure 1B

figure 2A



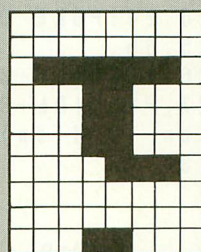
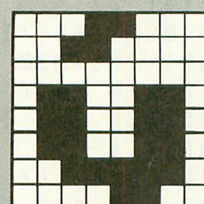


figure 2B

figure 4A



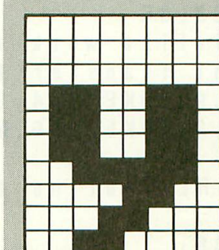


figure 4B

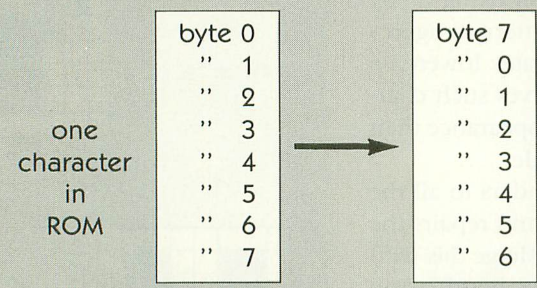
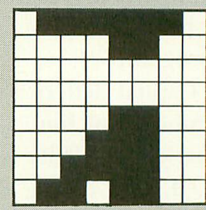
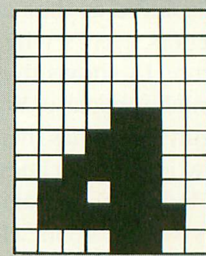


figure 3


figure 5A


figure 5B

Listing 1

```
30 GRAPHICS 0
40 REM Turn off TV display
50 POKE 559,0
60 REM Find start of display list
70 DL=PEEK(560)+256*PEEK(561)
80 REM Modify display list to ANTIC mo
de 3
90 POKE DL+3,67
100 FOR I=6 TO 24:POKE DL+I,3:NEXT I
110 POKE DL+25,65
120 POKE DL+26,PEEK(DL+30)
130 POKE DL+27,PEEK(DL+31)
400 REM Turn on TV display
410 POKE 559,34
```

Listing 2

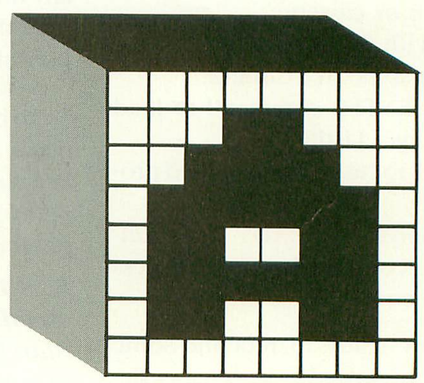
```
10 REM Reserve 4 pages of RAM for char
acter set
20 MEM=PEEK(106)-4:POKE 106,MEM-1:RAMS
TART=256*MEM
140 REM Load ML routine
150 FOR I=1 TO 35:READ A:POKE 1535+I,A
:NEXT I
160 DATA 104,160,255,162,7,177,203,72,
136,177,203,200,145,205
170 DATA 136,202,208,246,104,145,205,1
36,192
180 DATA 255,208,233,198,206,198,204,1
98,207,208,223,96
190 REM Initialize work variables for
 character set transfer to RAM
200 POKE 203,0:POKE 204,227
210 POKE 205,0:POKE 206,MEM+3:POKE 207
,4
220 REM Call ML routine to move charac
ter set
230 A=USR(1536)
380 REM Turn on new character set
390 POKE 756,MEM
```

Listing 3

```
240 FOR J=1 TO 7:READ OFFSET:OFFSET=OF
FSET*8
250 FOR I=0 TO 7:READ A:POKE RAMSTART+
I+OFFSET,A:NEXT I:NEXT J
260 REM comma,semicolon,g,j,p,q,y
280 DATA 12,0,0,0,0,0,24,24,48
290 DATA 27,0,0,24,24,0,24,24,48
300 DATA 103,102,60,0,62,102,102,62,6
310 DATA 106,6,60,6,0,31,6,6,6
320 DATA 112,96,240,0,124,102,102,124,
96
330 DATA 113,6,15,0,62,102,102,62,6
340 DATA 121,24,48,0,102,102,102,62,12
```

Listing 4

```
240 FOR J=1 TO 10:READ OFFSET:OFFSET=0
FFSET*8
270 REM CTRL-.,CTRL-;,Shift-=
350 DATA 96,48,126,0,0,60,102,12,24
360 DATA 123,102,60,0,0,126,12,24,12
370 DATA 124,126,12,0,0,12,28,60,108
```




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COMPUTER GRAPHICS

PRODUCT SURVEY

Unlocking the art inside you

by DAVID DUBERMAN

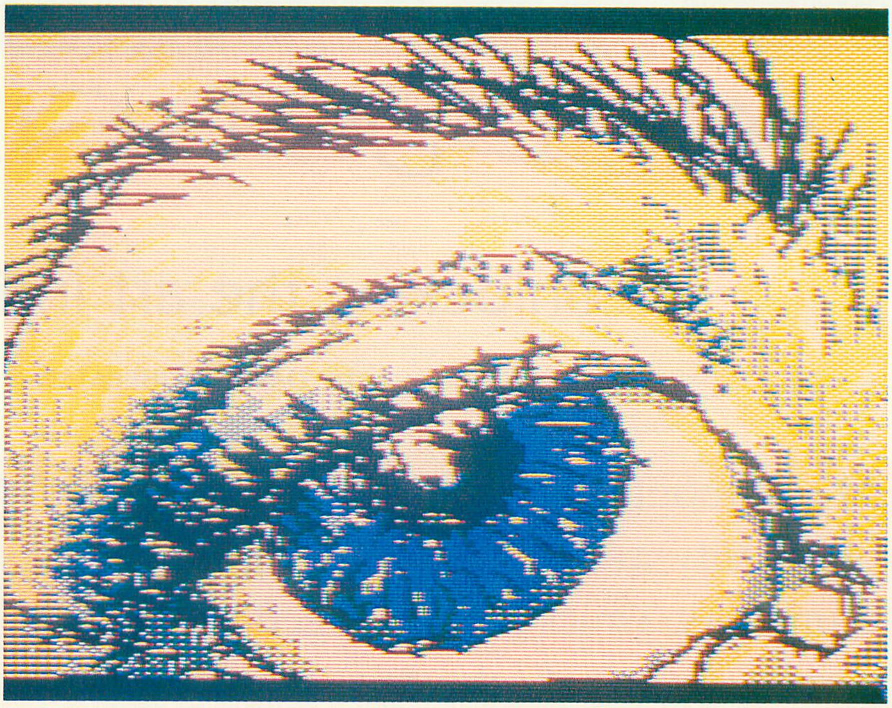
The computer's incredible power as a tool for artistic creativity was once only available to adept programmers and dedicated number crunchers. Times have changed. Today, low-cost visual arts hardware and software make the Atari—with its unequalled graphics potential—the perfect tool for a serious artist or an inventive computer novice.

With the products described in this survey, you can easily produce effects similar to what used to be available only on $10,000 graphics systems. You can use your computer to draw pictures or cartoons, design a letterhead for your stationery, make your own personal greeting cards.

You can create video games and elaborate video animation without complex programming. You can take advantage of graphics applications for professions or hobbies as diverse as weaving, landscape architecture or astrology.

Let's take a look at the affordable, easy-to-use tools for computer graphics . . .

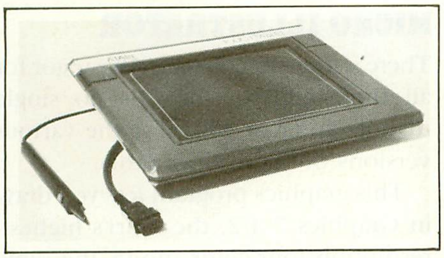
GRAPHIC TABLETS



BROOKESE by Kyle Bogertman
Atari Touch Tablet w/ Micro Illustrator
(Atari Artist)

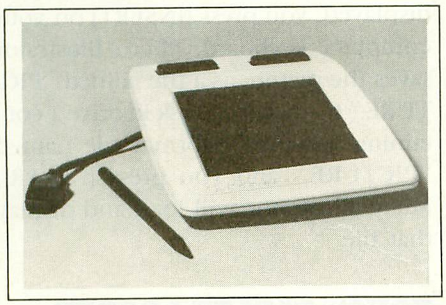
Until recently, most graphics programs for the Atari used the joystick for drawing on the screen. Now, Atari owners can choose between three touch tablets. Touch tablets have flat pressure-sensitive surfaces. When you draw on these with a stylus, your movements are registered on the screen.

Two of these, the KoalaPad and the Atari Touch Tablet, are similar. The third, the PowerPad, works on a different principle and is much larger.



ATARI TOUCH TABLET

The Atari Touch Tablet, ($89.95 — all prices in this survey are suggested retail) measures 9 3/8 inches wide by 7 3/4 inches high by about 1 inch thick, the size of an average hardcover book. The drawing surface is 6 1/2 inches wide by 5 inches high — about the same height-width ratio as the standard Atari graphics screen. A cable permanently attached to the back connects the touch tablet to joystick Port One, and there is a jack in the rear for plugging in the accompanying stylus. The Atari tablet's stylus is the only one that has a button built in, which is a real convenience. There are also two buttons on the tablet, located on either side of the drawing surface. All three buttons select options from the drawing program. The tablet comes with the Atari Artist drawing program on a cartridge. Atari Artist is the same program as Micro Illustrator, which is discussed below.



KOALAPAD TOUCH TABLET

The KoalaPad (Koala Technologies, $125), which was designed to be used by a number of different computers, is similar to the Atari tablet. It's noticeably smaller though, measuring 6 3/8 inches wide, 8 inches high, and the thickness tapers from 1 3/4 inches at the rear down to 1/4 inches square. The tablet can be held comfortably by an adult in one hand, leaving the other available for drawing. A cable at the rear connects to the joystick port. There's no place to connect or store the stylus, though, so it could easily get lost. The KoalaPad comes with the Micro Illustrator drawing program on diskette. Also available from Koala are several software packages for the tablet, including Spider Eater, a musical educational game, and Coloring Series 1, an electronic "coloring book" of geometric patterns.

POWER PAD

The PowerPad is covered fully in a separate review adjoining this survey. No software accompanies the PowerPad, but several programs, including Micro Illustrator, are available for use with it.

COMPARE AND CONTRAST

All three touch tablets use a version of Micro Illustrator, an excellent drawing program. Functional differences among the tablets when using Micro Illustrator are minimal. You can draw with your finger, but most people prefer using the stylus. If you only intend to use Micro Illustrator with your tablet, the chioce narrows down to deciding which size tablet is most comfortable for you (and possibly your children).

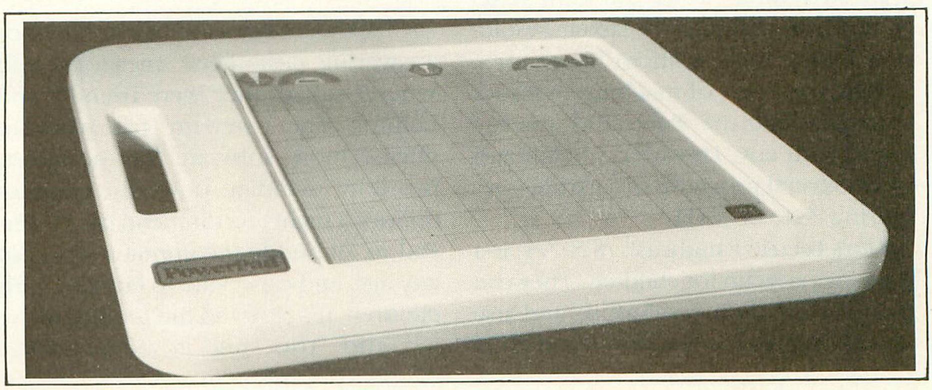
If you want to do more with a touch tablet, however, other criteria come into play. Touch tablets can, for example, be used as controllers, similar to joysticks and paddles. The PowerPad is particularly well-suited for use as an alternative to the keyboard for children because it can sense multiple contacts on its surface. The other two can sense only one contact at a time. Thus, if you touch one point on the KoalaPad or the Atari tablet, then while holding the first, touch another, the second contact won't register. The PowerPad can sense simultaneous contacts, and can, for example, be used as a piano keyboard. Indeed, PowerPad's manufacturer, Chalk Board, markets such a package, called Micro Maestro.

Also available for the PowerPad is the Programming Kit for BASIC. If you want to write a program that uses PowerPad as a controller, this package should tell you all you need to know. The KoalaPad documentation contains minimal information on programming for the touch tablet, but you can buy a book called the *KoalaPad Touch Tablet Programmer's Guide* for further information. The Atari Touch Tablet documentation describes only how to use the tablet in conjunction with the accompanying graphics program.

The drawing surfaces differ slightly from pad to pad. The KoalaPad's surface is a small square of finely-textured hard black plastic. It's smooth enough to draw quickly on, yet provides enough friction for slower detail work, and appears to be quite durable.

The Atari Touch Tablet's drawing surface is a sheet of thin, shiny black plastic, covered by a removable sheet of transparent plastic. Atari recommends that you leave the plastic overlay in to avoid damaging the actual surface. The overlay can also be used to hold down drawings for tracing. The pad is just a bit too large and heavy to hand hold comfortably; it should be placed on your lap, a desktop or tabletop.

The PowerPad is much larger than the other two. You can't hold it in your hands, an smaller children may have a hard time holding it in their laps. The drawing surface is a permanently attached thin sheet of plastic. However, all software for the PowerPad comes with special overlays that customize the tablet for each application.



POWER PAD

Chalk Board Inc.
3772 Pleasantdale Rd.
Atlanta, GA 30340
(404) 496-0101
$99.95 — hardware
Reviewed by David Plotkin

The **PowerPad** is Chalkboard's new graphics tablet. With its combination of features, reasonable price, friendly support, and wide range of software, it would be an excellent addition to your hardware.

The first thing you notice about the PowerPad is that it's big: it measures 17 inches by 14 inches, with a drawing surface 12 inches square. It is easier to draw on than the smaller surfaces of other tablets.

The PowerPad uses 14,400 tiny digital switches to read where pressure is applied to the pad. There are 10×10 per inch. Unlike the surfaces of other pads, the PowerPad has no problem resolving simultaneous multiple inputs. This ability allows the PowerPad to be used as much more than just a graphics tablet: it becomes a flexible input device.

If you've done a little arithmetic, you may be wondering about the PowerPad's resolution. Ten switches per inch by 12 inches equals 120 points, or pixels — not even as high resolutions as Graphics 7! However, it's possible to design a program using the Atari's highest-resolution screen, by "software stretching" of the resolution.

The version of Micro Illustrator ($49.45) for the PowerPad has a special feature called "Scale" that uses "software stretching" to let you draw pixel by pixel, even though the tablet's resolution isn't as high as Micro Illustrator's.

Hardware isn't of much use without software, but the PowerPad doesn't come with any. However, Chalkboard offers several programs in cartridges requiring 32K of RAM.

Leo's Lectric Paintbrush ($29.95) is a drawing program for children. They can paint in medium resolution, and use special commands like MOVE and FILL. The program is easy to use, but is limited to a few of the Atari's colors, and lacks advanced features. You can save and load pictures with a disk drive.

Micro Maestro ($29.95) is a piano keyboard overlay program for the PowerPad. This is *fun*. The overlay also shows a musical staff, and you can play notes by pressing on either the staff or the piano keys. When you play a note, its letter name, key location, and staff position are shown on the screen, giving the program strong educational value. You can play four-note chords, and record and play back your songs. Sounds pretty good!

The Programmers Kit ($24.95) provides extensive technical information about the PowerPad. The manual tells you how to read PowerPad's switches, with demonstrations, utility routines in BASIC and machine language, and a technical discussion of the pad's operation. This lets you design your own programs, or adapt existing programs for use with the tablet.

A fifth program, Logic Games ($39.95), involves matching symbols and numbers. Also available is BearJam ($39.95), an educational game that's supposed to help prepare children for reading, (we will review these in future issues).

Chalkboard has a toll-free number for answering customers' questions, and when I called, they were friendly and helpful. The company has plans to release more software for the tablet, possibly including powerful graphics utilities. I highly recommend the PowerPad to all budding computer artists of any age, and especially to families with children. It's easy and fun for kids to use — and too big to ever lose!

MICRO ILLUSTRATOR

There is a version of Micro Illustrator for all three tablets, (there is no single manufacturer or price for the various versions of Micro Illustrator).

This graphics program lets you draw in Graphics 7 1/2, the Atari's highest-resolution four-color mode, the same mode used by Micro-Painter (Datasoft). Micro Illustrator uses an icon menu, in which all the program's different functions are depicted graphically. The program's different modes include Draw (doodle), Point (control single pixels), and Line, (draw straight lines). You can also draw boxes and circles (outlined or filled), and create a sunburst effect with the "rays" function. You can draw with "mirroring," magnify your drawing for fine detail work, fill areas with colors and patterns, and save and load images from disk. You can change color, size and shape of your "brush," and you can create a magical "rolling rainbow" effect. When combined with a touch tablet's ease of use, Micro Illustrator makes creative graphic expression with a computer as natural as taking a bath.

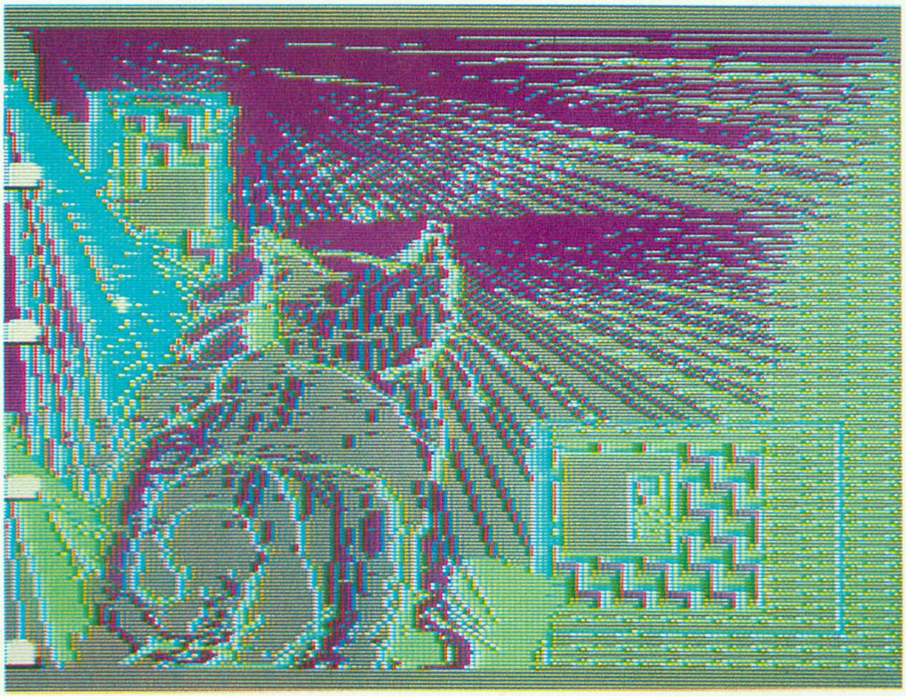
Micro Illustrator uses a compressed format for file storage that's incompatible with other drawing programs. *But you can also use the "standard" Micro-Painter format*. If, when the picture is displayed, you press [INSERT] on your computer keyboard, Micro Illustrator saves the picture as a file named "PICTURE." If you have a disk in drive 1 containing a standard-format file named "PICTURE," and you press [CLEAR], Micro Illustrator will load and display that file.

TOUCH TABLET LOADER

New from Atari Customer Service as a FREE listing booklet is John Clark's very useful utility program, Touch Tablet Loader. This lets you insert into your own programs any picture made with the touch tablets and software previously mentioned, as well as compatible products. You can also learn how to write programs that enable you to use your touch tablet as a controller.

For your Free Demopac, simply write to Atari Customer Service. Address is at the end of this survey.

LIGHT PENS



RAINCAT by Patricia Fostar
Atari Light Pen with AtariGraphics

A light pen is a type of pointing device for computers. Despite its name, the light pen does not produce light, but contains a light-sensitive cell at its tip to detect the presence or absence of light. A light pen also can convey its position on a screen to the computer.

In graphics applications, light pens are used to draw directly on the monitor screen. There is no abstraction between the drawing process and the production of the drawing; it's more

STEVE GIBSON: CREATOR OF ATARIGRAPHICS

Story behind the powerful new light pen software

by NAT FRIEDLAND, **Antic** Editor

Steve Gibson, the president and main resource of Gibson Laboratories in Irvine, California said he'd been up till 6 a.m. working on his next light pen software package. Possibly he felt he needed to burn the sunrise oil to come up with something as good as his brand-new AtariGraphics cartridge software — which now comes bundled with the Atari Light Pen.

Gibson's AtariGraphics is described in detail in the survey of computer-art tools featured in this issue. The bottom line is that this light pen software is a computer graphics classic on the level of Micro Illustrator or Micro-Painter. For ease of use and variety of elaborate color patterns built-in, AtariGraphics ranks at the very top. It also has valuable unique features, such as enabling you to "fill over" existing patterns inside shapes you've already set up in your picture. Even the Macintosh won't do this.

Known as the light pen programmer par excellence, Steve Gibson first became an industry star with his Apple Computer light pen software.

A JOY TO WORK WITH

"The Atari computer was a joy to work with, compared to the Apple," said Gibson. "The Apple is full of what I call 'Wozni-isms'. That's all the crazy and weird things Steve Wozniak did in order to squeeze color into his early machines. The even bits and odd bits stand for different colors, every seventh bit is keyed to a color family. Working with this stuff is a horrible nightmare."

He discovered other not-widely-known advantages in doing professional programming with the Atari. "The good news is that Atari has absolutely phenomenal documentation on hand. You can get virtually a 100 percent accurate map of memory locations or ANTIC chip display list functions in the manufacturer's hardware manuals. It pinpoints what you need to do to make precise color changes at precise scan lines.

"It's also not too shabby to have Atari's palette of 128 colors to select from," he added.

Gibson used the Atari's hardware capabilities to suggest some of the new features he could incorporate into his emerging software design.

"I get excited by the graphics potential of microcomputers," he said. "But eventually I realized that what really turns me on is coming up with unique and powerful user interfaces — ways to make it easier than ever for people to get more out of their computers."

One of the AtariGraphics interfaces he's most pleased with is the sliding menu "index cards." He said, "The illusion of the familiar is a powerful trick for getting people into easily operating the software."

NO KEYBOARD COMMANDS

"What I set out to do in AtariGraphics was a light pen tour de force," said Gibson. "I wanted to make a graphics program with absolutely NO keyboard commands.

As a result, the Atari keyboard is always in text mode. What this means is you can enter text anywhere on the screen, simply by pointing to a position with your light pen and starting to type.

Possibly the most unique interface in AtariGraphics is the light-pen "eraser emulation" Gibson created. "I've never seen anything else like it," he said. "Since I wanted to avoid any keyboard commands, I was very pleased when I realized that the Atari would allow programming of a 'cancel' interpretation just by shaking the light pen from side to side over the screen area you want to erase."

As befits a light pen specialist, Gibson has faint praise for the highly popular touch tablets. "Touch tablets can't be beaten for accurate tracing of illustrations," he said. "But I still think light pens are unbeatable as a direct graphics interface device, as well as for making icon menu selections effortlessly."

THE VIDEO EASEL

Gibson seems to have a very strong vision of future artists sitting on stools in front of easels, making light pen strokes on video monitors positioned where their blank canvases used to be.

The programming of AtariGraphics took him only three months of entering code — following a month of nothing but planning and research. He is now committed, through a contract with Koala, to program light pens for one or perhaps two other popular computers. "After Atari, I'm finding myself a little burnt out with new graphics projects," he said. "I mean, how many lines of rubber banding code can you write?"

Gibson was raised just north of Silicon Valley in San Mateo. He dropped out of the University of California at Berkeley after 18 months and started working for high tech start-up companies.

He financed the start of Gibson Laboratories by doing several years of consulting for medical electronics companies in Southern California. He designed and programmed 3-D medical graphics displays that were widely used in cardiology.

What the future holds for Steve Gibson (as soon as he finishes his light pen commitments) is an exploration of creating more active user interfaces for computer telecommunications. "I don't see why your home computer has to function like a dumb terminal when you're on line with a bulletin board or a telecommunications information service," he said. "I think that at the very least, you should be able to store your menus in advance and flash them up oncreen to work right along with the remote computer, instead of waiting for all the time-consuming scrolling through every option."

continued from page 41

flexible than drawing on a physical surface. However, because most monitor screens are vertical, drawing requires an unnatural position. Also, prolonged proximity to a color TV screen, which may be a common circumstance with light pens used in the home, may cause discomfort or health problems.

ATARI LIGHT PEN WITH ATARIGRAPHICS

Most light pens are physically similar to one another. The Atari Light Pen ($99.95) is a good example. Made of smooth black plastic, it's about the size and shape of a ballpoint pen. It contains an on/off switch activated by pushing the pen's tip against a flat surface.

What's special about this pen is the software. Steve Gibson's AtariGraphics cartridge software is a stunning realization of the Atari computer's graphic capabilities. The program's four pop-up icon menus let you choose drawing mode (box, circle, line, and parallelogram), color, mirroring (vertically, horizontally, and four-way), and pattern fill, among others. You can choose from 2,880 patterns and you can fill any pattern over with another pattern, something most other graphics programs won't let you do. You can also do unique "smear" effects and erase directly on the screen.

AtariGraphics is easily the most impressive drawing program we've seen at Antic in recent memory. *(See the interview with Steve Gibson in this issue.)* AtariGraphics works in as little as 16K RAM and can use cassette or disk for file storage. AtariGraphics files are incompatible with other drawing programs.

EDUMATE LIGHT PEN

The Edumate Light Pen (Futurehouse, $34.95), is the simplest light pen covered here, because it lacks a built-in switch. You activate this pen by pressing the [START] key on the computer console. Made of red plastic, the light pen resembles a Bic ballpoint attached to a coiled cord. The Edumate pen's main advantage is price: at $34.95 list, it's the least expensive hardware/software package in this survey. The pen comes with a disk containing six programs. Peripheral Vision ($39.95 or $59.95 with light pen) is Futurehouse's new graphics program for their Edumate light pen. The program was still under development when this survey was completed, so we were only able to review a preliminary version.

Unlike any other graphics utilitiy in the survey, Peripheral Vision uses a GTIA mode, Graphics 11. This gives you 16 colors of the same brightness in a screen whose resolution is 80 pixels horizontally by about 168 vertically. A strip at the screen's bottom displays an icon menu, and your selection of colors is arrayed across the top of the screen.

The icon menu's Fill feature resembles a water tap flowing into a bucket, and Zoom looks like a microscope. You can save and load pictures with a disk drive. And there's a feature to let you print out your creations directly, which wasn't ready for testing yet. You can doodle, or draw single lines, consecutive lines, triangles, circles, and rectangles. Use the keyboard to place text anywhere in the picture.

Other functions let you move or copy parts of a picture to another part, fill enclosed areas with solid colors or a limited palette of textures, and draw with mirroring. The documentation describes how to use pictures made with Peripheral Vision in your own programs.

The tradeoff with this program is that you can use more colors than with most others, but the resolution is lower. Actually, the vertical resolution is high, but with only 80 pixels across the screen's width, this mode's pixels have an odd shape — wide and flat. Nevertheless, you can draw in this mode creatively.

Futurehouse also makes a line of educational software that includes titles such as Alphabet Construction Set (learn to draw letters of the alphabet), Computer Crayons (an electronic coloring book), and Little Red Riding Hood, a computerized story book for young children.

TECH-SKETCH LIGHT PEN

The Tech-Sketch pen is available in two versions: the $39.95 version includes some BASIC programs on disk, and the $69.95 version comes with Micro Illustrator. The pen is composed of plastic and metal, and appears sturdier than other pens. There's a small white button to activate the pen located in the shaft's side near the tip. The pen is easier to use than the Edumate, but not as easy as the Atari Light Pen.

McPEN

McPen (Madison Computer, $49) is the newest light pen for Ataris, and is the largest pen in this survey. The pen itself is made of sturdy beige plastic and has a rather wide barrel. It plugs into a control panel with a coiled cord. The control panel, which measures 5 inches square by 1 1/2 inches high, has a dial for sensitivity and a red LED, and a receptacle for the pen. Installation instructions for the pen and panel are included on a label attached to the bottom of the panel — a considerate feature.

McPen doesn't have a built-in switch. Accompanying software uses the space bar to turn the pen on and off. Included with the pen is a disk containing four BASIC programs: Tic Tac Toe; QB graphics, a limited drawing program; a menu program; and Ballon, a Player/Missile graphics demonstration. Madison Computer also offers additional software for the pen — titles so far are "McPen Learning Series" and "Coloring Book," with more to come. **Antic** didn't have the opportunity to review these packages yet.

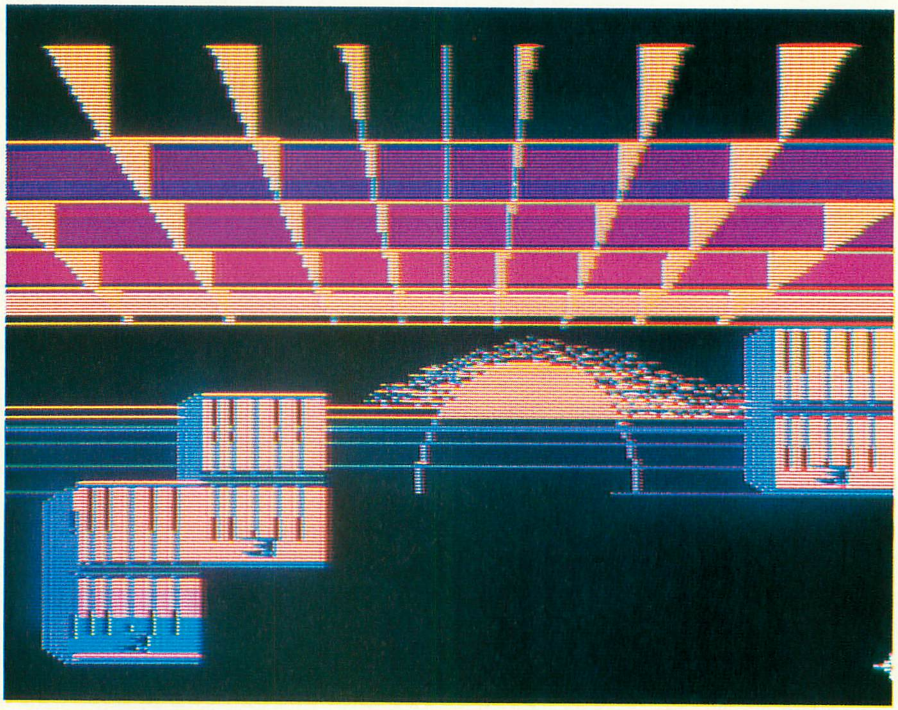
We did, however, try McPen with programs for other light pens, including Tech-Sketch's version of Micro Illustrator and the AtariGraphics cartridge. Unfortunately, the pen didn't work very well with either program. This is the only instance of a light pen being incompatible with software from other companies.

SUMMARY

Although the light pens covered in this survey are more similar than different, the accompanying software varies significantly. If you choose to buy a light pen, be guided by the level of sophistication you require in a drawing program. Try to get a demonstration of the pen and program. Also, keep in mind that software manufactured for use with a certain light pen works equally well with most other light pens, with the exception of McPen.

continued on next page

GRAPHIC JOYSTICK SOFTWARE



FINAL 7 by Linda Tapscott
Fun With Art

Before the introduction of the KoalaPad, most graphics software for the Atari used the joystick for drawing. Many of these programs are still available. Drawing with a joystick is somewhat awkward, but you can achieve impressive results with practice. We'll cover the major joystick graphics programs in approximate order of the date of release.

MICROPAINTER

This is the granddaddy of graphics programs for the Atari. When **Antic** had a cover art contest for readers in 1983, 90% of the entries were with this program. Micro-Painter (Datasoft, $34.95) lets you doodle, draw lines, and fill areas with limited patterns in Atari's high-resolution four-color mode, Graphics 7 1/2. Micro-Painter's storage format for picture files has come to represent a standard for Atari graphics files. Almost all printer dump programs for Atari, including Micro Illustrator, will work with this file storage format.

GRAPHICS MASTER

Graphics Master (Datasoft, $34.95) is described by its makers as a tool for creating, manipulating, and editing images for graphic layouts and designs. You can use the joystick to draw, or you can have the program draw shapes for you, including lines, circles, and polygons of three to nine sides.

You can create a window that picks up images, manipulates them (you can "rotate" an image in the window 90 degrees) and relocates them on the screen. The contents of the window can be laid over or under an existing image, for special effects. You can flip between two drawing screens, transfer images between the two, add text, and zoom in for fine detail work.

Graphics Master uses Graphics 8, the Atari's one-color high-resolution mode. But you can add color by "artifacting," an effect that's explained well in the documentation. There is also a program that lets you use images from other programs with Graphics Master, and vice-versa. Although they use different graphics modes, you can transfer images between Graphics Master and Micro-Painter. Graphics Master is the only tool in this survey that *includes a printer dump* for its images.

PAINT

Originally from Reston Publishing and now marketing by Atari, Paint ($39.95) is a remarkably versatile drawing program. There's a simplified version that's well suited for young children, but SuperPaint is the program's showpiece. A row of "pots" along the bottom of the screen lets you paint with any of four colors and six patterns. You can change the colors and the patterns, and you have hundreds from which to choose. All commands are explained with a help feature. You can also "zoom" in for magnified detail work. Paint uses Graphics 7, a medium-resolution four-color mode. One of Paint's nicest features is the accompanying 147-page book, of which approximately two-thirds is an interesting discussion of computers, art, and computer graphics. Paint is available only on disk, and files from Paint are not compatible with other programs. (See review of Paint in **Antic**, January 1984.)

PM ANIMATOR

Player/Missile graphics is a special feature of the Atari that lets you move several objects about the screen display without disturbing the background. PM Animator (Tronix, $44.95) lets you create animation sequences for use in your own BASIC programs. The documentation is extensive enough so that someone with no knowledge of P/M graphics programming can use the software with little difficulty. Player/Missile graphics are technically not related to the graphics discussed in the rest of this survey, so it's no surprise that files from this program can't be used by other programs. (See review of PM Animator in **Antic**, July, 1983).

MOVIE MAKER

Movie Maker (Reston, $60) is a computerized animation studio. You can create "movies" up to 300 frames and then add music and sound. It's similar to PM Animator in that you're drawing objects, combining them in sequences and moving the animated objects about the screen. However, Movie Maker is entirely self-contained, you can't use the animations in your own program. Also, Movie Maker doesn't use P/M graphics; all images are drawn in Graphics 7. (See review of Movie Maker in **Antic**, April 1984).

FUN WITH ART

Fun With Art is a joystick drawing program with many bells and whistles. It uses 7 1/2, as does Micro-Painter, but that's where the similarity ends. First, you can easily change any or all colors at every other scan line (a scan line is a thin horizontal line on your video screen). Because two scan lines are drawn every 1/60th of a second and go together to form the screen image, it is a simple matter to use all 128 of Atari's colors in one picture.

Also, you can load two pictures and transfer parts between them. You can move parts of one picture around. Fun With Art is a cartridge requiring 32K RAM; it can store pictures on disk or cassette. Files from Fun With Art are not compatible with other programs. However, the documentation does describe how to use the pictures in your own programs. (See review in **Antic**, February, 1984).

SCREEN MAKER

This is a tool for programmers who wish to create impressive graphics for games or other applications, but who have yet to delve into the mysteries of the display list, a mini-program used by the ANTIC chip in the Atari to display information on screen. Atari has several different graphics modes, most of which cannot be displayed simultaneously, or mixed on the screen. This can be a problem if you want to display text and graphics together. Screen Maker (Atari Learning Systems, $34.95) lets you custom design a screen, combining as many as 15 different graphics modes, and then writes a subroutine that creates the screen. You can then use this subroutine in your own program. (See review in **Antic**, March 1984).

PLAYER MAKER

Described as a companion utility to Screen Maker, Player Maker (Atari Learning Systems, $34.95) lets you design images to be used with Player/Missile graphics. You use a joystick to "sculpt" a player, pixel by pixel. You can create up to four players, and combine pairs for more detailed three-color players. Once you've drawn the players, the software writes a subroutine for use in your own program. There is no provision for animation of players.

continued on next page

GRAPHICS MAGICIAN

Graphics Magician (Penguin, $39.95), recently converted for the Atari, has been popular on Apple computers for some time. It's an ideal tool for those who need to store a lot of graphic information in a minimum of disk space. Possible applications include graphics adventures and educational programs that use visual material. The program lets you use the joystick to draw four colors in Graphics 7 1/2. You can doodle, draw lines, and fill areas with one of a wide selection of textures. You can also change the size and shape of your "brush," change the basic colors at will, and add text. On-line help is available if you get confused.

It's common in graphics adventures to have "objects" that appear and disappear from the screen while background remains intact, possibly as a result of being picked up or dropped by the adventurer. Graphics Magician lets you draw these "objects" and store them as separate files. Extensive instructions for using Graphics Magician files in your own programs are included. **Antic** will review this excellent product in the near future.

VISUALIZER

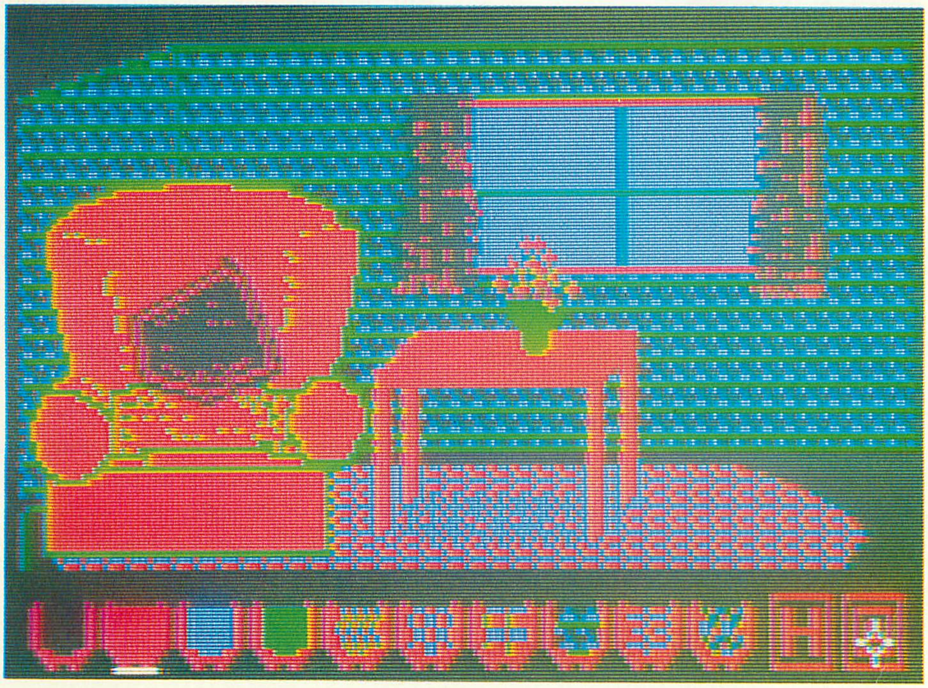
Maximus's new "graphics management system" is called Visualizer ($49.95). Subtitled "electronic slide creator/projector," the program's functions are divided into two parts: creating "slides" and showing them. For the game-oriented, there's also a jigsaw game that scrambles your picture, then lets you use the joystick to move the pieces to their proper positions. A printout feature lets you produce a permanent copy of your pictures with Epson and C. Itoh-type printers.

To create slides, you use a joystick to draw in Graphics 7, Atari's medium-resolution four-color mode. You can doodle with brushes of different sizes or automatically create circles, ovals, rectangles, and straight lines. Fill enclosed areas with solids or patterns (made by combining two colors), and add text. The program comes with three fancy "fonts," or character sets, to spiff up text in the picture, and you can mix style options for a total of 24 different styles in each font. You can design your own font too. You can save and load slides with a disk drive, and a special feature lets you combine two slides by "merging" them for experimentation and special effects.

There are some fairly simple animation effects. One-color, two-color, and three-color switching involve changing the contents of the three color registers used for drawing shapes and lines. There are three different ways to add the by-now-familiar Atari moving rainbow effect to your pictures.

The slide show part of the program is almost as powerful as the drawing part. You can select an assortment of slides and arrange them into any order. There's an auto timer routine to advance the slides automatically. If you have an Atari 410 or 1010 program recorder, you can add a synchronized narrative soundtrack! (You will also need a stereo cassette recorder or deck and a data cable for connecting the recorder to the computer.) The program comes with a sample narrated slide show that describes Visualizer.

The documentation is more complete than that for most such programs. There are suggestions for creating better slides, and a list of interesting projects for parents and children. There are detailed instructions for setting up a system to record synchronized narrative tapes Programmers will learn how to use the pictures in their own program. If you don't mind the medium resolution of Graphics 7, you'll find this to be a powerful and versatile package.



GREEN VASE by Marni Tapscott
Paint

AND MORE

ATARI 1020 COLOR PRINTER

The Atari 1020 Color Printer ($299) is actually a plotter. It uses four pens to draw on a 4 ½-inch wide strip of paper. Plotters have been around for some time, but this is the first plotter that works directly with Atari computers.

A color plotter is an enormously versatile graphics tool. You can make four-color screen dumps (graphics printouts) of pictures drawn with most graphics programs. You can also write programs to control the plotter directly. A couple of samples are included with the 1020 documentation.

Text can be printed in four colors, in four directions (forward and backward, vertically and horizontally), and in different sizes. You can even print text in 80 columns—the characters are tiny, but well-formed and quite legible.

The 1020 documentation provides adequate information for programming the plotter. Commands are presented in BASIC syntax, but it's easy to convert these to other languages. Among the graphics functions are commands to return the pen to HOME position, change pen color, draw from coordinates 0,0 to any X-Y position, initialize (call the current pen position 0,0), and relative draw (a combination of the last two). There's also move and relative move, for changing the pen's position without drawing. And you can command the plotter to set up X and/or Y axes for graphing.

SCREEN PRINT SOFTWARE

Screen Print Software is the new program from Atari that does color screen dumps to the Atari 1020 plotter. You can get full-color printouts of your creations from AtariGraphics, AtariArtist, Micro Illustrator, Micro-Painter, Paint, or any other program that uses Graphics 7, 7 ½, or 8. Atari started packing Screen Print Software with all 1020 Plotters shipped as of July, 1984. If you've bought a plotter that didn't include this software, you can obtain it for a minimal fee (not determined at this writing) by writing to Atari Customer Support, which is listed at the end of this survey.

SUMMING UP

As you can see, graphics tools for Atari computers are many and varied. How to choose? Well, we hope that the information in this survey will help you get started. If you'd like to see how a program works, but can't get an in-store demonstration, consider visiting (or joining, or starting) a local users group. You'll probably find someone who owns the product you're interested in. And don't forget — **Antic** is always looking for dynamite images for our Microscreens section, and we pay cash!

ATARI, INC. and ATARI LEARNING SYSTEMS
(Screen Maker, Player Maker, Paint, AtariGraphics, Atari Light Pen, Atari Touch Tablet, 1020 Color Plotter)
Atari Customer Service
1312 Crossman Ave.
P.O. Box 61657
Sunnyvale, CA 94086
(408) 745-2000

CHALK BOARD, INC.
(Power Pad)
3772 Pleasantdale Rd.
Atlanta, GA 30389
(404) 496-0101
(800) 241-3989 (from outside GA)

DATA SOFT, INC.
(Micro Painter)
9421 Winnetka Ave.
Chatsworth, CA 91311
(818) 701-5161

EPYX
(Fun With Art)
1043 Kiel Court
Sunnyvale, CA 94089
(408) 745-0700

FUTUREHOUSE
(Edumate Light Pen)
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Chapel Hill, NC 27514
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KOALA TECHNOLOGIES CORP.
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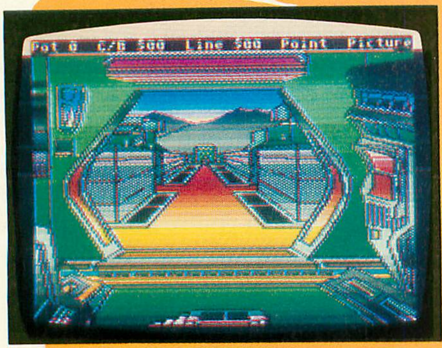
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(McPen)
1825 Monroe St.
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PENGUIN SOFTWARE
(Graphics Magician)
830 4th Ave.
P.O. Box 311
Geneva, IL 60134
(312) 232-1984

RESTON PUBLISHING GROUP
(Moviemaker)
11480 Sunset Hills Rd.
Reston, VA 22090
(800) 336-0338

TECH SKETCH INC.
(Tech Sketch Light Pen)
26 Just Rd.
Fairfield, NJ 07006
(800) 526-5214
(201) 227-7724 (in NJ)

TRONIX
(PM Animator)
8295 South La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529



SYNOPSIS

This program lets you change all four colors on every scan line in pictures drawn with most graphics programs that use Mode E, Atari's high-resolution four-color mode. It works on all Atari computers, but requires a disk drive. Antic Disk Subscribers: Remove BASIC. From DOS. Type L [RETURN] then type PAINTER.EXE.

You've been painting with tools like your KoalaPad or Micro-Painter for some time now, and you've pushed the programs to the limit. You're tired of having only four colors available! What can you do?

Fortunately, here's Philip Price's Color Picture Painter, a program allowing you to systematically replace all four colors in each scan line of your pictures—with *any of the 128 colors* available on the Atari. (Scan lines are the horizontal lines traced by the electron beam of your picture tube. Each scan line represents a fraction of a picture you have created on your Atari.)

Price's Painter loads an uncompressed Mode E file, (called Mode 7 ½ on older 400s and 800s or Graphics Mode 15 on the XL computers), and then allows you to choose from 16 colors and eight degrees of brightness for each of the four colors used in the original drawing. You use the joystick to color one scan line at a time, or to color entire vertical bands at once.

When you are finished the painter stores the original picture and the four color "pots" that you've created. The five files are separate, and are combined only when you run the painter program.

Price's painter works with files created by Micro-Painter, and Micro Illustrator, (available with the KoalaPad, Atari's Touch Tablet, Tech Sketch's Lightpen and Chalkboard's PowerPad). Incidentally, if you are using the Touch Tablet, you will need to save your initial file in the uncompressed 62 sector mode by hitting the [INSERT] key while the picture is on your monitor. The file will be named "PICTURE." and you will need to go into DOS and rename the file "FILENAME.PIC".

It's easy to get started coloring . . .

STEP 1: STARTING

Painter is a machine language program that's produced by the BASIC program accompanying this article Type in the listing, and SAVE an extra backup copy. Next, RUN this program. The screen will go dark for several minutes so the computer can read the data faster. If you made a typing error, the program will stop and display the number of a line you need to retype correctly—so TYPO isn't needed. When the screen turns blue again, press [RETURN] to write the machine language program named PAINTER.EXE to disk.

Remove your BASIC cartridge (XL owners press [OPTION] while booting DOS) before using Painter. Load PAINTER.EXE from DOS with menu option L. If you wish to have the program load automatically upon booting, use DOS menu option E to rename the file to AUTORUN.SYS, and make sure DOS.SYS exists on the disk.

When painter starts, you will be asked which file to load. The file disk must be in drive 1, and the filename extender must be .PIC. Don't use backspace or cursor controls, since the program will only accept a maximum of eight keystrokes before going to the graphics screen. Use DOS to rename files if necessary. Type in the name of the file you had previously created with, say, Micro-Painter. After the picture loads, you'll see it on screen with the default colors, the colors used in your original drawing. If you didn't use all four colors when making your original, some pots will be black, but they can be colored with Painter.

STEP 2: COLORING

Plug a joystick into Port 1. Press the fire button while pushing forward or backward on the stick to position the arrows on either side of the screen. Release the button and move the joystick from side to side to select the color, move forward and backward to change a color's intensity. Note that you're in point mode (see the line at the top of the screen); this means that you will color one line at a time.

If you have trouble seeing the thin horizontal line's color, look at the top of the screen to see the color changes is a wider area. If you want to color larger areas, press [ESC], then [SELECT] to switch to brush mode, and push the stick forward and backward to paint large areas with the currently selected color. Press [ESC], then [SELECT] again to return to point mode.

STEP 3: BACKGROUND AND FOREGROUND

You have a palette of four pots, based on the four colors of your original file. The palette is the field of colors in a given pot, without the structured picture. To change the pot whose colors you're modifying, press [SELECT]. To switch back and forth between the picture and the palette, press [OPTION].

You can review the colors you're using without seeing the picture by switching to the palette, then using [SELECT] to move through the four pots.

STEP 4: SAVING

Press the [START] key to save the pots, but not the picture file. According to Philip Price, the program occasionally locks up when you press [START], necessitating rebooting. The program saves four files representing the four pots. Checking your disk directory, you'll see them called FILENAME.P0, .P1, .P2, and .P3, with FILENAME replaced by the filename you originally typed in. If you have the original file and the four pots on the same disk, and don't change any filenames, the next time you load the picture into Painter, the four pots will also be loaded.

If you wish to work on a different picture, you must reload the entire program and start again from the beginning.

Philip Price taught himself programming while serving at sea with the US Navy. He took his discharge in Hawaii and worked near Hilo as a computer technician. Now he's teamed with Gary Gilbertson and their major new graphics adventure game, ***The Alternate Reality Series*** *is due for release by Marsten Systems this fall.*

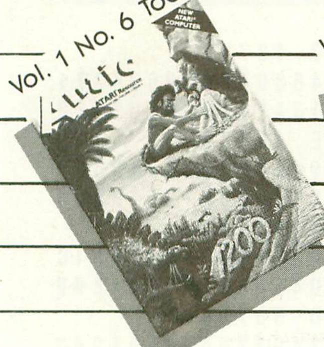
continued on page 51

PRICE'S COLOR PICTURE PAINTER

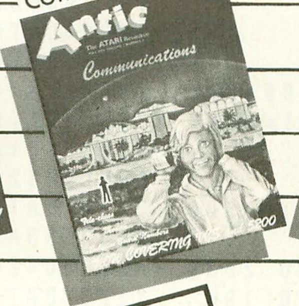
by PHILIP PRICE

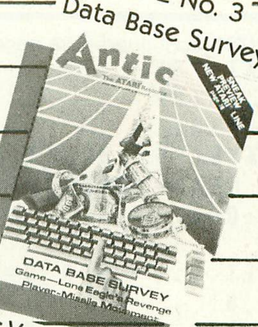


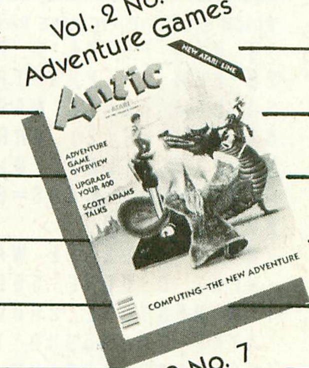

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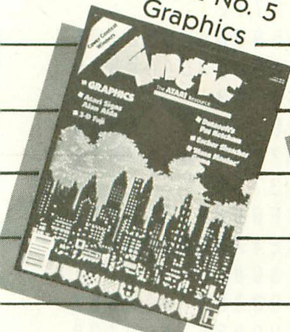

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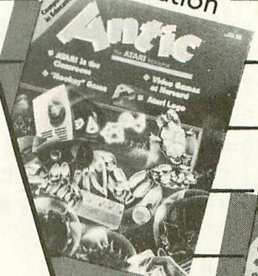

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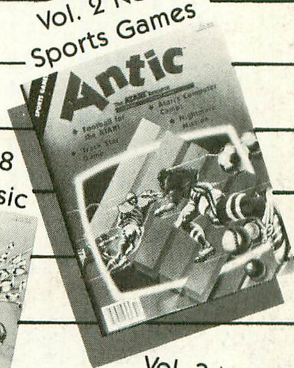

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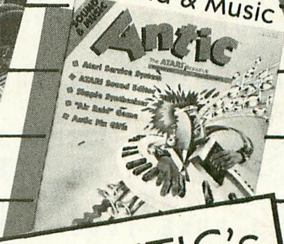

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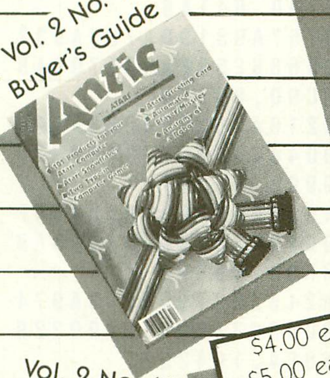

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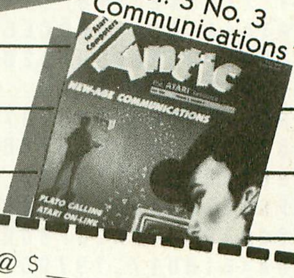

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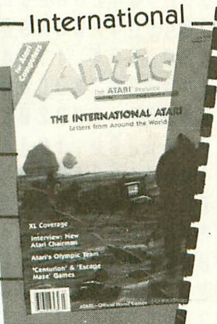
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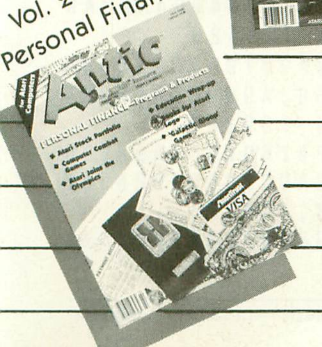
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PRICE'S COLOR PICTURE PAINTER continued from page 49

```
10 REM PRICE'S PAINTER
20 REM BY PHILIP PRICE
30 REM ANTIC MAGAZINE
40 DIM H$(2),ARRAY$(96),HOLD$(3500),HE
X$(23),FILE$(20):HEX$="@ABCDEFGHI#####
##JKLMNO":CASS=0:Q=1
60 TRAP 500
70 ? "↖PLEASE WAIT....":FOR D=1 TO 500
:NEXT D:POKE 559,0
130 RESTORE 2000:FOR LINE=2000 TO 2530
 STEP 10:GOSUB 140:NEXT LINE:GOTO 190
140 READ ARRAY$,LSUM:FOR HNUM=1 TO LEN
(ARRAY$) STEP 2:H$=ARRAY$(HNUM,HNUM+1)
150 D=0:FOR I=1 TO 2:D=D*16+ASC(HEX$(A
SC(H$(I))-47))-64:NEXT I
155 SUM=SUM+(ASC(H$(1,1))+ASC(H$(2,2))
):HOLD$(Q,Q)=CHR$(D):Q=Q+1:NEXT HNUM
160 CL=PEEK(183)+PEEK(184)*256:IF CL<>
LINE THEN POKE 559,34:? "LINE ";LINE;"
 IS MISSING.":END
170 IF LSUM<>SUM THEN 500
180 RETURN
190 POKE 559,34:? "⊠↖PRESS <RETURN> TO
 SAVE THE FILE.":INPUT H$
200 CLOSE #1:OPEN #1,8,0,"D:PAINTER.EX
E":IOCB=848:POKE IOCB+2,11
210 ADDRESS=ADR(HOLD$):ADHI=INT(ADDRES
S/256):ADLO=ADDRESS-ADHI*256
220 BYTES=LEN(HOLD$):NUMHI=INT(BYTES/2
56):NUMLO=BYTES-NUMHI*256
230 POKE IOCB+4,ADLO:POKE IOCB+5,ADHI:
POKE IOCB+8,NUMLO:POKE IOCB+9,NUMHI
240 X=USR(ADR("hhh⊠LVd"),16)
250 CLOSE #1:? "↖⊠ALL DONE.":END
500 TRAP 40000:POKE 559,34:? "↖⊠↓↓BAD
DATA AT LINE #";LINE:END
2000 DATA FFFF00560956D06070C2F056004E
002069566B564E0030CB56C657410056101112
131415161718192122232425,4823
2010 DATA 2629F04A4A4A4AAABDCE5660290F
AABDCE5660306F74001000002302200041010
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2090 DATA 456E74657220746865205069637 4
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2270 DATA 45032056E4A210A9079D4203A944
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AD00D32908F00C4CE85B4C71,159852
2320 DATA 5D4C925D4CB35D4CD45D4CFC5C4C
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```

new products

GRAPHICS MAGICIAN PICTURE PAINTER

(graphics program)
Penguin Software
830 4th Ave.
P.O. Box 311
Geveva, IL 60134
(312) 232-1984
diskette — 48K — $39.95

Hundreds of pictures can be stored on a disk and, literally, thousands of colors are available when using the Graphics Magician Picture Painter. Full use of the 128 colors on the Atari, including blending of them, enables you to get those many shades. Text may also be added to pictures, and the various brushes allow the user to add detail and shading to creations. And, when you want to recall art from your own programs, this package lets you do that too.

THE COLOR SHARPENER CABLE

(peripheral)
Bytes and Pieces
550 N. 68th St.
Wauwatosa, WI 53213
(414) 785-1100
$24.95
add $2.00 for shipping and handling

The Color Sharpener is said to drastically increase the color intensity on color monitors. Using a 5-pin din plug which attaches to the monitor, it augments the intensity of the luminous part of the signal, thereby offering a substantially sharper picture. Satisfaction is guaranteed, or your money will be refunded. Dealer inquiries are invited.

ROME AND THE BARBARIANS

(game)
KRENtek software
P.O. Box 3372
Kansas City, MO 66103
cassette and diskette — 32K — $35.00

The year is 400 A.D., and half a dozen tribes of barbarians are simultaneously invading the Roman Empire. As the supreme military commander, you initiate defense strategies which, when combined with the chaotic activities of the barbarians, insure that no two games are alike. Played on a scrolling map of Western Europe, your final challenge is—who else?—Attila and his Huns.

Return the favor. When you call a manufacturer or supplier about a product you've seen advertised or otherwise mentioned in ANTIC, please tell them so. This will help us to continue to bring you the latest information about products that will make your Atari computer an even more valuable investment in the future. —ANTIC ED

50 MISSION CRUSH

(game)
Strategic Simulations, Inc.
883 Stierlin Rd., Bldg. A-200
Mountain View, CA 94043
(415) 964-1353
diskette — 40K — $39.95

As the commander of a B-17, you must deftly manuever your way through fifty life-threatening raids over France and Germany. It is your responsibility to hand-pick your crew, determine your plane's bomb/fuel ratio, and select the cruising altitude. After each mission, you will be evaluated and awarded points by the computer, on the basis of various criteria. Survive all fifty missions and make it to Brigadier General, and SSI will honor you with a Certificate of Achievement.

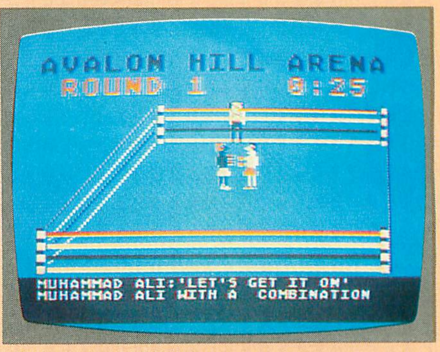
PHYSICS EXAMPLES I

(educational program)
Conduit
The University of Iowa
Oakdale Campus
Iowa City, IA 52242
(319) 353-5789
diskette — 48K — $60.00
additional user's notes — $3.00
additional copy of software — $10.00

For secondary and college levels, this package of four programs covers topics in introductory mechanics and is suitable for individual student use or classroom demonstration. Each program simulates an experiment and allows students to vary parameters to see how they affect the results. The 37 pages of User's Notes included in the package introduce the concepts simulated in each program and provide students with a series of exercises. This program is made only for the Atari 800.

COMPUTER TITLEBOUT

(games)
Microcomputer Games, Inc.
4517 Harford Rd.
Baltimore, MD 21214
(301) 254-9200
diskette — 48K — 30.00



If you're a professional boxing fan who wants to test the "Raging Bull" within, Computer Titlebout will give you the opportunity to slug it out with the best. This game contains in-depth statistics on over 300 famous fighters, past and present, and allows you to either recreate their own well-known bouts or dream up some matches that should have happened, but never did.

SKYWRITER

(educational program)
Atari, Inc.
1265 Borregas Ave.
P.O. Box 427
Sunnyvale, CA 94086
(408) 745-2000
cartridge — 16K — $39.95

Young people, ages 6-14, can improve their word-comprehension skills and increase their vocabulary by playing Skywriter, just one of the games in the new Atari Learning Software line. As word-filled clouds drift through the sky, a player must ensnare them with a plane and connect them to form compound words. A colorful city-scape screen, charming music, and plenty of challenges inspire learning, and, if level eight is mastered, the player receives a special award of merit.

new products

600XL MEMORY EXPANSION MODULES

RC Systems, Inc.
121 W. Winesap Rd.
Bothell, WA 98012
(206) 771-6883
32K model, AM2 — $79.00
48K model, AM1 — $99.00

These memory modules plug directly into the back of the Atari 600XL computer, increasing the computer's total read/write memory capacity to 32K or a full 48K. Automatically recognized by BASIC and machine language programs, they will not conflict with program cartridges.

ATARI AUTOMATIC STATION SWITCHER

(peripheral)
Micro Systems Support
Suite 101, Lincoln Savings Bldg.
16325 S.W. Boones Ferry Rd.
Lake Oswego, OR 97034
(503) 635-5659
$214.00 — includes package of four standard-length cables

Fully automatic, the Atari Automatic Station Switcher can speedily network four computer systems to one set of peripherals. By connecting four stations to a disk drive and printer, the user gains the economy of sharing expensive peripherals without wasting time on awkward manual switching. The space-saving system is obviously perfect for small offices or classroom situations.

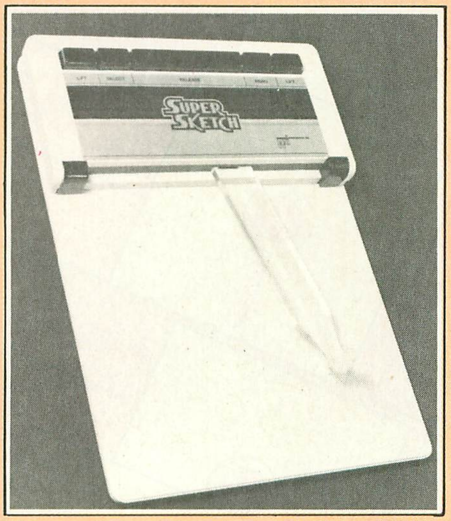
NUBASIC

(programming utility)
Galasa Software
16835 Algonquin St., Suite 199
Huntington Beach, CA 92649
(213) 836-7000
diskette — 16K — $19.95

Nubasic, compatible with the 400, 800, 600XL, and 800XL computers, is a 3K binary program which is co-resident with BASIC. It provides many new and useful direct-mode commands, and binary disk files can be loaded from BASIC (a function which is especially useful for loading short machine-language routines into page 6). Advantages are: low cost and memory requirement, no need for a right-cartridge slot, combination of function keys, and detailed documentation.

SUPER SKETCH

(graphics tablet)
Personal Peripherals Inc.
Merrick Park
930 North Beltline, Suite 120
Irving, TX 75061
(214) 790-1440
$49.95



The graphics tablet, Super Sketch, allows users to easily create exciting computer graphics in color. By simply moving the stylus control as you would a pencil, Super Sketch will reproduce the movement on the screen. Brilliant colors can be "painted" in with the push of a button. The manufacturer claims that it is easier to use than keyboard controls, does more than joysticks, paddle and mouse controllers, and is less expensive than touch pad products. Its own software cartridge is included in the package.

FROM SCRATCH

(application program)
HomeSpun Software
9 Peter's Path
E. Setauket, NY 11733
(516) 689-7163
cassette — 16K or 48K
diskette — 48K
$24.95

Sometimes it takes longer to find a recipe than to cook it. From Scratch!, the recipe-filing system, will organize your favorite dishes, as well as print out shopping lists for the necessary ingredients. Also, recipes can be quickly found for leftovers, and yield conversions can be made easily.

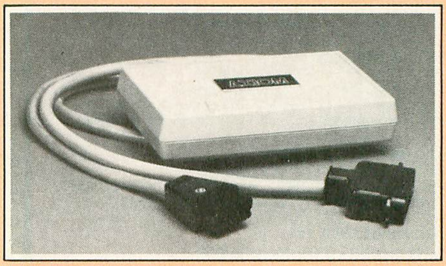
ASSEMBLY LANGUAGE TUTOR

(educational program)
Microlaser Software Inc.
Box F
Mendon, NY 14506
(716) 624-9318
$49.95

Assembly Language Tutor, is designed to provide machine language programmers with well-documented, actual-working source code specifically for Atari computers. Learn how to do I/O, graphics, scrolling, display list interrupts, floating point, player/missiles, plot and draw, and much more. The tutorial also possesses a BASIC to Assembler conversion program which will convert most BASIC statements to Assembler source code. Two disks and documentation are included.

PARALLAX-AT

(printer interface)
Axiom Corporation
1014 Griswold Ave.
San Fernando, CA 91340
(213) 365-9521
$99.00



ParallAx-AT is a compact expansion interface that connects any parallel-input printer to any Atari computer and operates just like the Atari 850 Interface, but without the serial ports. This interface is compatible with all Atari software designed to run with a standard parallel-input printer. Also, the open socket on the ParallAx-AT can be used for "daisy-chaining" other Atari peripherals such as cartridges and disk drives. Cables and connectors are provided.

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The ATARI® Resource

Antic delivers Atari with its library of public domain software. These disks and cassettes contain non-copyrighted material from Atari users across the U.S. Presently we have 12 disks and 4 cassettes.

These programs are sold as is. Their usefulness may depend on your expertise. No documentation is included except in the programs. They may also contain programming quirks that require some modification, however all products do perform. Contents may vary slightly from that described due to unforseen circumstances, but each disk and cassette is filled with useful programs. At only $10.00 each, plus $1.50 for shipping and handling, this is an extraordinary value!

Send check or money order and product coupon to:

ANTIC'S SOFTWARE LIBRARY
524 SECOND ST.
SAN FRANCISCO, CA 94107

Or use the business reply envelope in this issue. Allow four weeks for delivery.

ANTIC GAMES DISK #1
1. CHICKEN: a great game from Antic Vol.1, No.1*
2. HANGMAN: the traditional word game
3. CREATION 4. REVERSE 5. MONOPOLY*
6. LUNAR LANDER 7. ZONEX: hidden color patterns
8. CLEWSO: detective adventure

ANTIC GAMES DISK #2
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4. ARTILLERY 5. WUMPUS: text adventure

ANTIC GAMES DISK #3
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5. PLUS ZERO 6. COLLISI
7. SPEED DEMON, and more

ANTIC GAMES DISK #4
1. VULTURES: Stan Ocker
2. CASTLE HEXAGON: also by Ocker
3. ADVENTURE: the remainder of the disk contains an adventure game which you can play or modify to write your own adventure games.

ANTIC GAMES DISK #5
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2. STELLAR DEFENSE 3. MASTERMIND
3. HAMMURABI: the classic simulation 4. SLALOM
5. COUCH: analyze yourself 6. ACEYDUCY & MORE

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1. SPIDER: from ANTIC Vol.1, No.3
2. RAINBOW 3. HORSES 4. ATARI logo 5. OXYGEN
6. SPIRAL 7. PRETTY 8. MESSAGE and more

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Requires Music Composer Cartridge
1. PRELUDE 2. JOPLIN 3. IN MY LIFE 4. STAR TREK
5. DAISY 6. GREENSLEEVES
7. YELLOW SUBMARINE, and many more

ANTIC GR. & SO. DEMO #1
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5. ETCH SKETCH 6. BABY PRO SOUND and more

ANTIC UTILITY DISK #3
1. DISASSEMBLER: from ANTIC Vol. 2, No. 1
2. TINY TEXT: from ANTIC Vol.1, No. 6
3. GTIA TEXT WINDOW: from ANTIC Vol. 2, No. 1
4. LABEL: disk label on Epson
5. SET UP PRINTER: sets up MX80 for Visicalc

ANTIC UTILITY DISK #2
1. BUBBLE SORT: from ANTIC Vol. 1, No. 4
2. TYPO: from ANTIC Vol. 1, No. 3
3. HOME INVENTORY
4. RENUMBER 5. COMPARE: listings for differences
6. MODEM 7. RT CLOCK and more

ANTIC UTILITY DISK #1
1. DOC: program allows you to accompany programs with separate documentation on disk.
2. MICROASSEMBLER: allows you to create USR routines-assembler, more
3. NUM: automatic line numbering utility in BASIC
4. MEMTEST: runs without BASIC cartridge, to test all memory
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ANTIC MUSIC DISK #2
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6. CHOPSTIX

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2. SUPER WUMPUS SAM, requires S.A.M. cartridge 3. MOONBASE
4. GRAVITY 5. PIG 6. FISH
7. DEFENSE

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GAMES #2	☐	☐
GAMES #3	☐	☐
GAMES #4		☐
GAMES #5	☐	☐
GRAPHICS DEMO #1		☐
PHOTO GRAPHICS		☐
UTILITY #1		☐
UTILITY #2		☐
UTILITY #3		☐
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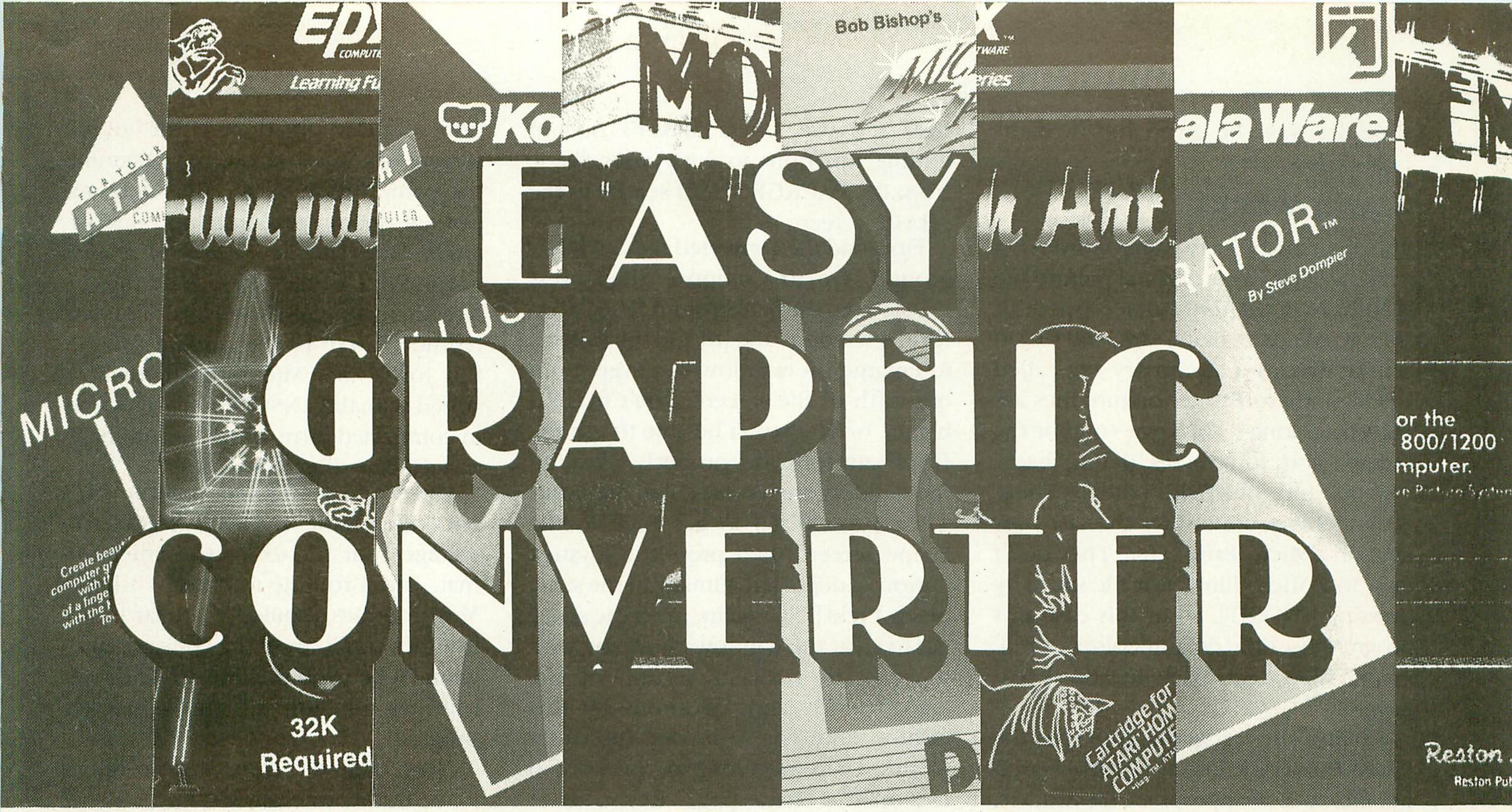
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EASY GRAPHIC CONVERTER

Mix and match graphics from four popular products

by CHARLES JACKSON
Antic Staff Writer

Have you ever wished you could use Micro-Painter to create backgrounds and shapes for your Movie Maker files?

Are you looking for a graphics utility program that lets you draw with your lightpen *and* joystick *and* KoalaPad *and* Power Pad?

Have you ever wanted to use Fun With Art drawing functions with your Micro Illustrator pictures? If such possibilities arouse your curiosity and creativity, graphics conversion utilities are for you.

Graphics conversion programs modify your pictures files so they may be used with other drawing programs. Such a program, for example, might accept a Micro Illustrator picture file and use it to make a compatible Fun With Art picture file. This BASIC program converts picture files created by Micro Illustrator (Tech-Sketch, Chalkboard, and Koala), Micro-Painter (Datasoft), Movie Maker (Reston), and Fun With Art (Epyx).

SYNOPSIS

This program, which converts picture files between different drawing software products, requires BASIC, a disk drive, and a minimum of 32K RAM. It runs on all Atari computers. Antic disk subscribers RUN "D:CONVERT. BAS".

HOW TO USE THE GRAPHICS CONVERTER

Type in Graphics Converter, check it with TYPO, and SAVE an extra copy for backup.

The computer will prompt you for the type and name of your source file (the file you want to convert). Type in the correct number from the menu, [RETURN], then type the filename. Don't type [D][:], just the filename. Next, the computer will ask you the same two questions about your output file (the file you're converting into).

When you've answered all four questions, the computer will spend between three and six minutes creating a converted file and storing it in disk memory. The program will NOT alter or erase your original picture file if you specify a name for the output file that's different from the input file.. When the computer is through, it will print the name of the converted file on the screen.

Note that there are two ways to store and retrieve Micro Illustrator picture files: using its built-in STORAGE routines, and pressing the [CLEAR] and [INSERT] keys. When creating a Micro Illustrator picture for the converter, *never use the menu's storage selection!* To save such a picture properly in compatible standard mode, make sure your picture is on the screen, then press the [INSERT] key. Your drawing will be stored in a file called "PICTURE." To retrieve a picture saved this way, remove the menu from the screen and press the [CLEAR] key.

Pictures converted to Micro Illustrator

continued on next page

should always be given the filename "PICTURE."

HOW IT WORKS

The program uses a two-step conversion process. First, your original picture file is converted to Micro-Painter format (if it's not already in that form), and stored on the disk as a temporary file called "TEMP." Micro-Painter picture files are 7684 bytes long—7680 bytes outline the picture and four bytes define background and playfield colors. These "color" bytes are always the last four bytes in a Micro-Painter file. They don't exist in a Micro Illustrator file saved by pressing [INSERT], so in this case this program uses the default colors of red, green, blue, and black for the background.

Finally, the program converts the Micro-Painter file into a compatible output file, adds all appropriate file headers, footers and flags, and erases the temporary file.

MOVIE MAKER APPLICATIONS:

You can easily create colorful backgrounds for your Movie Maker animations with the aid of the converter. It is just as easy to create Movie Maker SHAPE files. Draw your shape with one of the above graphics programs and convert it to a Movie Maker BACKGROUND file. Boot the Movie Maker disk and use Movie Maker's built-in editing functions to copy your shape from the BACKGROUND screen to the SHAPE screen.

First load the converted file as a Background. Go to Compose, then press [ESC] to see the background. Use [W] to form a window, and [B] and the joystick to enlarge the window to cover about one fifth of the screen. Don't make it bigger, or you won't be able to use the Duplicate function properly. Position the window, then press [D] to duplicate. Then press [ESC] to get back to the Shape screen, then press the joystick button to deposit the image in the same place. Press [ESC] again, press the space bar to clear the window, move the window to an adjacent section of the background, and continue in this fashion until you've moved the entire picture, or as much of it as you want to use on the Shape page. If you don't move the joystick when going from the background to the Shape page, you'll wind up with an exact duplicate of the background on the Shape page.

EXPANDING THE CONVERTER

Experienced programmers can expand this converter utility to accept many more types of picture files. After deciding what type of file you'd like to add, you must discover how that type of file is put together. Run DOS's COPY function to print the picture file to the screen, or use a disk utility to examine the composition of the file. Some important questions to keep in mind include: Does the file use a header, such as Fun With Art files? Does it use footers, like Micro-Painter files? How are color registers saved? Is your picture saved in full form, like Micro Illustrator files stored with the [INSERT] key? Is it saved in compacted form, like conventionally saved Micro Illustrator files?

Once you've figured out the file's structure, write a BASIC routine to change your file to Micro-Painter format, and a routine to change it back. Your routines should be similar to the routines you'll see in the converter program. When you're done, ENTER your routines on top of the converter program.

Now, compose three short routines to use the Micro Illustrator, Movie Maker and Fun With Art conversion routines, and add them to the converter. Model the two-line routines after the routine in lines 570–580. Finally, increase NUM by one at line 180 and add the starting line numbers of your new routine to the computed GOSUB at line 440.

The Graphics Converter unlocks the door to a wider spectrum of uses for your graphics software, and is an invaluable brush in any electronic paintbox.

```
10 REM GRAPHICS CONVERTER
20 REM BY CHARLES JACKSON
30 REM ANTIC MAGAZINE
40 FOR N=78 TO 66 STEP -1:POKE 710,N:P
OKE 712,N:POKE 709,268-N:FOR Y=1 TO 14
:NEXT Y:NEXT N
50 DIM IN$(11),IN1$(13),OUT$(11),OUT1$
(13),HOLD$(13),Q$(1),COLREG(4)
60 ? "↖     *** GRAPHICS CONVERTER ***"
:?
70 POKE 710,66:POKE 712,66:POKE 709,20
2
80 ? "(1) Micro Illustrator"
90 ? "        (Tech-Sketch, Koala, "
100 ? "          Chalkboard)":?
110 ? "(2) Micro Painter"
120 ? "         (Datasoft)":?
130 ? "(3) Moviemaker"
140 ? "         (Reston)":?
150 ? "(4) Fun with Art"
160 ? "         (Epyx)":?
170 REM NUM = Number of types
180 NUM=4:TIM=6
190 ? :? "Type of source file (1-4) ";
:INPUT TYP1:?
200 IF TYP1>NUM THEN 190
210 ? "      Filename ";:INPUT IN$:?
220 IN1$="              ":OUT1$="
      "
230 IN1$(1,2)="D:":IN1$(3,13)=IN$
240 ? "Type of desired file (1-4) ";:I
NPUT TYP2:?
250 IF TYP2>NUM THEN 240
260 IF TYP1<>TYP2 THEN 280
270 ? "↖↓↓↓↓▸NEEDLESS CONVERSION":FOR
D=1 TO 500:NEXT D:GOTO 60
280 IF TYP2<>1 THEN 340
290 TIM=3.5
300 POKE 709,96:POKE 710,108:POKE 712,
108:? "↖↓↓↓↓↓↓↓↓Micro Illustrator files
 must be named 'PICTURE'"
310 ? :? "Press 'Y' to name the output
 file.":INPUT Q$
320 IF Q$<>"Y" THEN 60
```

```
33Ø OUT$="PICTURE":L=7:POKE 71Ø,66:POK
E 712,66:POKE 7Ø9,2Ø2:GOTO 36Ø
34Ø ? "     Destination filename":? "
  (No ext.)";:INPUT OUT$:L=LEN(OUT$
):?
35Ø IF TYP2=3 AND L>7 THEN 34Ø
36Ø OUT1$(1,2)="D:":OUT1$(3,L+2)=OUT$
37Ø IF TYP2<>3 THEN 39Ø
38Ø OUT1$(L+3,L+6)=".BKG":GOTO 39Ø
39Ø TYPE=NUM*TYP1+TYP2
4ØØ ? "    Please stand by . . ."
41Ø ? :? "(Approximate conversion"
42Ø ? " time: ";TIM;" minutes)"
43Ø REM BRANCH TO CONVERSION ROUTINES
44Ø ON (TYPE-(NUM+1)) GOSUB 51Ø,56Ø,59
Ø,72Ø,Ø,62Ø,11ØØ,86Ø,77Ø,Ø,89Ø,1Ø4Ø,92
Ø,1Ø7Ø
45Ø ? " Still working . . ."
46Ø IF (TYP1=2) OR (TYP2=2) THEN 135Ø
47Ø REM DELETE TEMP. FILE
48Ø OPEN #3,12,Ø,"D:TEMP"
49Ø XIO 33,#3,Ø,Ø,"D:TEMP":CLOSE #3
5ØØ GOTO 135Ø
51Ø REM Micro Illustrator to Micro Pai
nter
52Ø OPEN #1,4,Ø,IN1$:OPEN #2,8,Ø,OUT1$
53Ø FOR X=1 TO 768Ø:GET #1,M:PUT #2,M:
NEXT X
54Ø PUT #2,12:PUT #2,4Ø:PUT #2,2Ø2:PUT
 #2,15Ø
55Ø CLOSE #1:CLOSE #2:RETURN
56Ø REM Micro Illustrator to Movie Mak
er
57Ø HOLD$=OUT1$:OUT1$="D:TEMP":GOSUB 5
1Ø
58Ø IN1$=OUT1$:OUT1$=HOLD$:GOTO 62Ø
59Ø REM Micro Illustrator to Fun With
Art
6ØØ HOLD$=OUT1$:OUT1$="D:TEMP":GOSUB 5
1Ø
61Ø IN1$=OUT1$:OUT1$=HOLD$:GOTO 11ØØ
62Ø REM Micro Painter to Movie Maker
63Ø OPEN #1,4,Ø,IN1$:OPEN #2,8,Ø,OUT1$
64Ø COUNT=Ø:POKE 71Ø,66
65Ø TRAP 71Ø
66Ø FOR X=1 TO 4Ø:GET #1,M:PUT #2,M:CO
UNT=COUNT+1
67Ø IF COUNT=3844 THEN 7ØØ
68Ø NEXT X
69Ø FOR X=1 TO 4Ø:GET #1,M:NEXT X:GOTO
 65Ø
7ØØ FOR X=1 TO 3Ø:PUT #2,Ø:NEXT X:PUT
#2,1Ø6
71Ø TRAP 4ØØØØ:CLOSE #1:CLOSE #2:RETUR
N
72Ø REM Micro Painter to Micro Illustr
ator
73Ø OPEN #1,4,Ø,IN1$:OPEN #2,8,Ø,OUT1$
74Ø FOR X=1 TO 768Ø:GET #1,M:PUT #2,M:
NEXT X
75Ø CLOSE #1:CLOSE #2
76Ø RETURN
77Ø REM Movie Maker to Micro Painter
78Ø OPEN #1,4,Ø,IN1$:OPEN #2,8,Ø,OUT1$
79Ø DIM T(4Ø)
8ØØ K=Ø
81Ø FOR X=1 TO 96
82Ø FOR Y=1 TO 4Ø:GET #1,M:PUT #2,M:T(
Y)=M:NEXT Y
83Ø FOR Y=1 TO 4Ø:PUT #2,T(Y):NEXT Y:N
EXT X
84Ø FOR Y=1 TO 4:GET #1,M:PUT #2,M:NEX
T Y
85Ø TRAP 4ØØØØ:CLOSE #1:CLOSE #2:RETUR
N
86Ø REM Movie Maker to Micro Illustrat
or
87Ø HOLD$=OUT1$:OUT1$="D:TEMP":GOSUB 7
7Ø
88Ø IN1$=OUT1$:OUT1$=HOLD$:GOTO 72Ø
89Ø REM Movie Maker to Fun with Art
9ØØ HOLD$=OUT1$:OUT1$="D:TEMP":GOSUB 7
7Ø
91Ø IN1$=OUT1$:OUT1$=HOLD$:GOTO 11ØØ
92Ø REM Fun With Art to Micro Painter
93Ø OPEN #1,4,Ø,IN1$:OPEN #2,8,Ø,OUT1$
94Ø GET #1,M:GET #1,M
95Ø FOR X=1 TO 4:GET #1,M:COLREG(X)=M:
NEXT X
96Ø FOR X=1 TO 256:GET #1,M:NEXT X
97Ø FOR X=1 TO 7696
98Ø GET #1,M
99Ø IF X>4Ø8Ø AND X<4Ø97 THEN 1Ø1Ø
1ØØØ PUT #2,M
1Ø1Ø NEXT X
1Ø2Ø FOR X=1 TO 4:PUT #2,COLREG(X):NEX
T X
1Ø3Ø CLOSE #1:CLOSE #2:RETURN
1Ø4Ø REM Fun with Art to Micro Illustr
ator
1Ø5Ø HOLD$=OUT1$:OUT1$="D:TEMP":GOSUB
92Ø
1Ø6Ø IN1$=OUT1$:OUT1$=HOLD$:GOTO 72Ø
1Ø7Ø REM Fun with Art to Movie Maker
1Ø8Ø HOLD$=OUT1$:OUT1$="D:TEMP":GOSUB
92Ø
1Ø9Ø IN1$=OUT1$:OUT1$=HOLD$:GOTO 62Ø
11ØØ REM Micro Painter to Fun with Art
111Ø OPEN #1,4,Ø,IN1$:OPEN #2,8,Ø,OUT1
$
112Ø FOR X=1 TO 262:READ N:PUT #2,N:NE
XT X
113Ø FOR X=1 TO 7696
114Ø IF X>4Ø8Ø AND X<4Ø97 THEN PUT #2,
Ø:GOTO 116Ø
115Ø GET #1,M:PUT #2,M
116Ø NEXT X
117Ø PUT #2,Ø:PUT #2,Ø
118Ø FOR X=1 TO 4:GET #1,M:COLREG(X)=M
:NEXT X
119Ø CLOSE #1:CLOSE #2:OPEN #2,12,Ø,OU
T1$
12ØØ PUT #2,254:PUT #2,254
```

continued on next page

```
1210 FOR X=1 TO 4:PUT #2,COLREG(X):NEXT X
1220 CLOSE #2
1230 RETURN
1240 DATA 254,254
1250 DATA 1,2,3,4,112,112,112,78,0,80,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14
1260 DATA 14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14
1270 DATA 14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14
1280 DATA 14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14
1290 DATA 14,14,14,14,14,14,14,78,0,96,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14
1300 DATA 14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14
1310 DATA 14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14
1320 DATA 14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,14,65,0,6,104,170
1330 DATA 104,141,1,2,232,208,3,238,1,2,142,0,2,104,170,104,64,169,0,141,0,2,169,0,141,1
1340 DATA 2,169,192,141,14,212,76,95,228,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1350 ? :? "↖ File: ";OUT1$(3,LEN(OUT1$))
1360 ? "Created and stored."
1370 FOR N=66 TO 148:POKE 710,N:POKE 712,N:POKE 709,54+N:NEXT N:POKE 712,0
1380 END
```

TYPO TABLE

Variable checksum = 469001

Line num range			Code	Length
10	–	120	LJ	498
130	–	240	ZE	378
250	–	350	BW	520
360	–	470	EH	486
480	–	590	PS	505
600	–	710	UD	444
720	–	830	EO	443
840	–	950	QW	450
960	–	1070	IM	335
1080	–	1190	TA	454
1200	–	1290	PB	529
1300	–	1370	KT	554
1380	–	1380	GE	6

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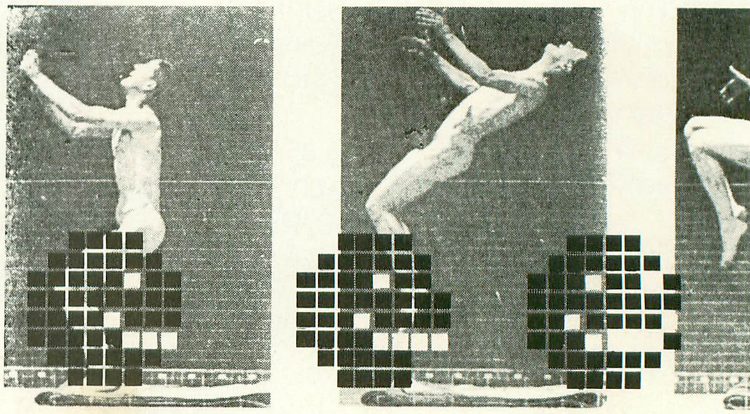
ROTATE YOUR PLAYER

Special effects with machine language

by LARRY PARKER

SYNOPSIS

This article demonstrates some of machine language's special capabilities. Listing 1 requires BASIC; listing 2 requires the Assembler Editor cartridge. The second listing is a routine to be called from BASIC—it does not run on its own. Both programs run on all Atari computers.



Player/Missile graphics are easy to use. Their flexibility and versatility allow you to experiment and create interesting effects. The following program gives the effect of a ball in P/M rolling right or left.

Type in and SAVE the first listing. RUNning the program shows you a smiling face which you can move with the joystick. As the face moves left or right, it appears to be rolling.

The key to this effect is the machine language program stored in ROT$. To call it, a USR command must be executed as follows:

A = USR(ML,ADR,NUM,DIR)

where ML is the address of the routine, ADR is the address to rotate, NUM is the number of bytes to rotate, and DIR is the direction to rotate (0 = left, 1 = right). The machine language routine itself is quite simple. Its source code is in Listing two and is documented.

Use the following steps to produce a rolling effect:

1. Shift every bit in each byte you want to rotate;
2. Check the carry bit;
3. If the carry bit is a 1, set bit 7 if shifting right, or set bit 0 if shifting left.

These steps cause each bit to move left or right and wrap around.

Note that in the USR call (LINE 450), the second parameter is offset by 2 (P0 + 2), so the top two bytes of the face are not rotated. If they are, the face will not appear to roll. To see this, change the +2 in LINE 450 to a +0 and RUN the program. The result shows that the routine has some restrictions. In order to completely produce the illusion of rotation, the portion to rotate must be eight bits wide.

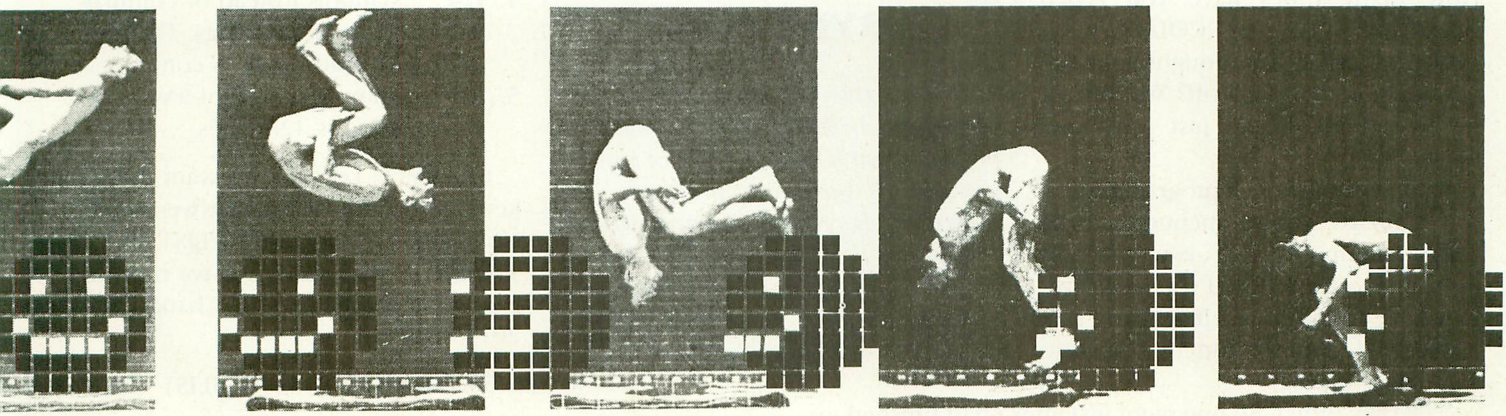
This is just one of the many special results produced by Player/Missile graphics. After experimenting with them, you can produce your own special effects.

Larry Parker entered the College of Engineering at the University of Michigan last year. In the past several years, he has written and sold several dozen programs in BASIC, using machine language routines.

Listing 1

```
10 REM ANTIC MAGAZINE
20 REM PLAYER MISSILE ROTATOR
30 REM BY LARRY PARKER
40 REM
70 REM READ MACHINE LANGUAGE DATA
80 REM INTO ROT$
100 DIM ROT$(60)
110 FOR I=1 TO 57:READ A:ROT$(I,I)=CHR
$(A):NEXT I
120 DATA 104,104,133,204,104,133,203
130 DATA 104,104,133,205,104,104,133
```

```
140 DATA 206,160,0,24,165,206,208
150 DATA 11,177,203,10,144,14,24
160 DATA 105,1,24,144,8,177,203
170 DATA 74,144,3,24,105,128,145
180 DATA 203,200,196,205,208,225,96
200 REM PLAYER MISSILE SETUP
220 RAM=PEEK(106):POKE 106,RAM-8:GRAPH
ICS 0:POKE 752,1:?
230 U=PEEK(106):X=120
240 POKE 704,14
250 POKE 54279,U
260 PM=256*U
270 FOR I=PM+512 TO PM+640:POKE I,0:NE
XT I
280 P0=PM+512+80
290 RESTORE 360
300 FOR I=P0 TO P0+7
310 READ A
320 POKE I,A
330 NEXT I
340 POKE 559,46:POKE 53277,3
350 POKE 53248,X
360 DATA 60,126,219,255,189,195,126,60
380 REM ROTATE PLAYER
400 S=STICK(0)
410 IF S=7 THEN DIR=1:X=X+1:GOTO 440
420 IF S=11 THEN DIR=0:X=X-1:GOTO 440
430 GOTO 400
440 POKE 53248,X
450 A=USR(ADR(ROT$),P0+2,4,DIR)
460 FOR D=1 TO 3:NEXT D
470 GOTO 400
```



Listing 2

```
0    *=$600
20  ;
30  ; --------------------------------
40  ; A=USR(ML,ADR,# BYTES,DIRECTION)
50  ;
60  ; ROTATES DATA LEFT OR RIGHT
70  ;
80  ; --------------------------------
90  ;
0100 ADR   = $CB
0110 BYTES = $CD
0120 DIR   = $CE
0130  PLA              ; IGNORE
0140  PLA              ; GET HI BYTE OF
 ADDRESS
0150  STA ADR+1
0160  PLA             ; GET LO BYTE OF
ADDRESS
0170  STA ADR
0180  PLA             ; IGNORE
0190  PLA             ; GET NUMBER OF B
YTES
0200  STA BYTES
0210  PLA             ; IGNORE
0220  PLA             ; GET DIRECTION
0230  STA DIR
0240 ;
0250  LDY #0
0260 LOOP CLC
0270  LDA DIR
0280  BNE RIGHT       ; RIGHT IF A 1
0290 ;
0300 LEFT LDA (ADR),Y
0310  ASL A           ; SHIFT LEFT
0320  BCC STORE       ; NO CARRY BIT
0330  CLC
0340  ADC #1          ; SET BIT 0
0350  CLC
0360  BCC STORE
0370 RIGHT LDA (ADR),Y
0380  LSR A           ; SHIFT RIGHT
0390  BCC STORE       ; NO CARRY BIT
0400  CLC
0410  ADC #128        ; SET BIT 7
0420 STORE STA (ADR),Y
0430  INY
0440  CPY BYTES       ; DONE?
0450  BNE LOOP        ; NO
0460  RTS             ; YES- RETURN TO
BASIC
```

CUSTOMIZING BASIC KEY FUNCTIONS

A shortcut to program typing

by MIKE FLEISCHMANN

SYNOPSIS

A devilishly clever technique for setting up two-keystroke "function-key" abbreviations that'll enter repeats of lengthy commands into your program. The BASIC listing requires a disk drive, and runs on all Atari computers of all memory configurations. Antic Disk Subscribers Run "D:BASICKEY.BAS"

How many times have you typed 'A$(LEN(A$)+1)=', or 'COLOR 1', or 'SAVE "D:', until you thought your fingers were going to fall off? Wouldn't it be nice if you could just press one key. . . ?

If you've done much programming in ATARI BASIC, you've encountered the finger cramping, shift key workout more than once. In fact if you're like me, you have found yourself wishing that ATARI had assigned function keys to save some typing.

Well they didn't. So one night just after I had finished my 43rd 'A$(LEN(A$)+1=" " ', I decided to do something about it. The following autorun program allows you to use the [CTRL] key and one other key to generate complete BASIC commands. In this program, the [CTRL] key and any other key can be used to print entire BASIC functions. If you assign the 'LIST "P:" ' command to the [4] key, for example, every time you type [CTRL] [4] the 'LIST "P:" ' command will appear on the screen.

It's easy to assign any BASIC command to any key. You can assign commands to their keys in lines 20000-29999 in the BASIC program. When making these assignments, you must follow a few simple rules:

1. Change only the string data between lines 20000 and 29999.
2. The last command string must be '@@@@@'.
3. Every assignment must follow this pattern:

   (KEY)(COMMAND)[:COMMAND: . . . :COMMAND](@)

   (KEY is any key, A-Z, 0-9.

   (COMMAND) is the command you want the key to produce.

   [:COMMAND: . . . :COMMAND] are any additional commands (optional).

   (@) is an end-of-command marker.
4. Use '\' symbols instead of commas in your command strings. The program will read them as commas.
5. The maximum length of any command string is 128 bytes.

EXAMPLE: Let's say we want the '4' key to generate 'PRINT "Answer Yes or No":INPUT A$', instead of 'LIST "P:" '. The BASIC data statement we need to change is in line 20150. Change line 20150 from:

20150 DATA 4LIST "P:"@,5LIST "D:@

to:

20150 DATA 4PRINT "Answer Yes or No":INPUT A$@,5LIST "D:@

The '4' key is changed.

CREATING THE AUTORUN FILE

Once you've made the key assignments, you must create the AUTORUN.SYS file. With a formatted disk (with the DOS.SYS and DUP.SYS files) at hand, RUN the program.

The program will ask you if you want a hard copy of your command set, just in case your memory needs refreshing once in a while. Type [Y] for "yes," [N] for "no". After the program has read your command set, it will ask you to place your formatted disk in drive #1. Do so. Press [RETURN] to create and store the AUTORUN.SYS file on the disk. Now, SAVE our KEY FUNCTION program to the disk as a backup, if you haven't already done so. To run the AUTORUN.SYS file, turn the ATARI off and then on again. The program will automatically load and patiently wait for you. Test the program by pressing the [CTRL] key while typing a key to which you have assigned a command. If it works, your command will appear on the screen. If a command didn't appear, check the data statements.

HELPFUL HINTS:

1. Don't assign anything to the [1] key, it will disable the [CTRL] [1] screen freeze.
2. Always press the [RESET] key before going to DOS. To recover the function keys after going to DOS, you must reboot.
3. Never use 'NEW' in a multiple command statement. Anything after it will be ignored.

A sample data set is included to allow you to experiment. The [CTRL] [0] command is a short routine that converts a hex digit to decimal.

HOW IT WORKS:

The BASIC program builder is a fairly straightforward disk output routine with the following "tricks":

1. In line 10000, the first 6 bytes are the binary file load header.
2. In the data statements between 10000 and 19999, values 500 and 501 are flags to tell the program where to put the end address of the assembly program and key data.
3. Line 30040 is the append data you need to make ATARI DOS think the file is an auto execute file.

The function key program starts by loading below the DOS.SYS program area and then shifting the MEMLO and APPMHI pointers to the end of the key data. Then the program puts its keyboard handler address into the jump vector at VKEYBD($209) and saves the old jump vector in its own jump location. (A positive side effect of this is that the program only uses the exact amount of memory it needs.) Then the program returns to BASIC.

When a key is pressed, the interrupt jumps to the function program. There, its value is checked to see if the [CTRL] key is pressed. If not, the program continues through the normal keyboard handler. When the [CTRL] key is pressed, the key character is converted to ASCII and compared with the command table. If a match is found, the command is sent to the screen and an 'RTI' (ReTurn from Interrupt) is effected. If no match is found, the registers are restored and processing continues through the normal handler.

```
5Ø REM BASIC 2 KEY CREATE PROGRAM
6Ø REM BY MIKE FLEISCHMANN
7Ø REM ANTIC MAGAZINE
1ØØ DIM S$(128),A$(1)
11Ø ? "[↖↓↓↓]":? " BASIC 2 KEY CREATE PROGRAM"
12Ø ? " THE OBJECT CODE IS IN AUTORUN FMT"
13Ø ? :? "DO YOU WANT THE COMMANDS TO BE PRINTED"
14Ø INPUT A$
15Ø IF A$="Y" THEN FLAG=1:REM FLAG=1 ->SEND TO P: FLAG=Ø -> SEND TO SCREEN
16Ø REM
17Ø REM Need to find out how long the ML program is. So we count
18Ø REM the bytes in the data statements.
19Ø READ D
2ØØ IF D<Ø THEN 22Ø:REM The -1 is a terminator
21Ø CT=CT+1:GOTO 19Ø
22Ø READ S$:REM Now we count the # of bytes in the commands
23Ø CT=CT+LEN(S$)
24Ø IF S$(1,1)="@" THEN 31Ø:REM Looking for the 5 '@' signs at end
25Ø REM Since we have to read the commands anyway may as well print
26Ø REM them out in readable form. Note: leave '@' sign so
27Ø REM we know if there are any blanks at the end of command.
28Ø IF FLAG<>1 THEN PRINT " CTRL ";S$(1,1);" = ";S$(2)
29Ø IF FLAG=1 THEN LPRINT " CTRL ";S$(1,1);" = ";S$(2)
3ØØ GOTO 22Ø
31Ø CT=CT+7424-6:REM Add in starting addr. of ML code - the header
32Ø REM for a ML boot file.
33Ø CTH=INT(CT/256):CTL=CT-CTH*256:REM Compute the low and high
34Ø REM Now wait for the user.
35Ø ? "Press return when the disk you want "
36Ø ? " is in drive [1] ":INPUT A$
37Ø OPEN #3,8,Ø,"D:AUTORUN.SYS":REM Get ready to output.
38Ø RESTORE :REM Set pointer to top of data.
39Ø READ D
4ØØ IF D<Ø THEN 46Ø:REM Look for -1
41Ø REM 5ØØ & 5Ø1 are flags to tell prgm where to put end addr.
42Ø IF D=5ØØ THEN D=CTL
43Ø IF D=5Ø1 THEN D=CTH
44Ø PUT #3,D
45Ø GOTO 39Ø
46Ø REM ML program output. Now we output the command set.
```

continued on next page

```
470 READ S$
480 FOR I=1 TO LEN(S$):REM Output stri
ng byte by byte.
490 D=ASC(S$(I,I))
500 IF D=ASC("\") THEN D=ASC(",")
510 PUT #3,D
520 NEXT I
530 IF S$(1,2)="@@" THEN 550:REM Look
for the 5 '@' signs.
540 GOTO 470
550 REM The program & data set are out
. Now output the autoload appendage.
560 FOR I=1 TO 7:READ D:PUT #3,D:NEXT
I
570 CLOSE #3:STOP :REM DONE
10000 REM
10010 REM Below is the data for the ma
chine language program.
10020 REM DO NOT MODIFY!!!!!!
10030 REM
10040 DATA 255,255,0,29,500,501,234,16
0,1,173,8,2,153,182,29,200,173,9,2,153
,182,29,169,44,141,8,2,169,29
10050 DATA 141,9,2,169,500,141,231,2,2
4,105,112,169,501,141,232,2,105,1,133,
15,96,88,142,192,29,140,193
10060 DATA 29,173,9,210,72,41,128,208,
4,104,24,144,113,169,3,133,245,169,30,
133,246,104,41,63,170,189
10070 DATA 195,29,201,255,240,94,133,2
47,160,0,177,245,197,247,240,24,201,64
,240,80,200,177,245,201,64
10080 DATA 208,249,200,24,152,101,245,
133,245,144,228,230,246,208,224,230,24
5,208,2,230,246,174,22,228
10090 DATA 172,23,228,232,208,1,200,14
2,187,29,140,188,29,160,0,177,245,201,
64,240,13,140,194,29,32,186
10100 DATA 29,172,194,29,200,24,144,23
7,169,0,133,77,169,48,141,43,2,174,192
,29,172,193,29,104,64,174
10110 DATA 192,29,172,193,29,76,0,80,0
,76,0,80,69,58,155,0,0,0,76,74,59,255,
255,75,43,42,79,255,80,85
10120 DATA 255,73,45,61,86,255,67,255,
255,66,88,90,52,255,51,54,27,53,50,49,
44,32,46,78,255,77,47,255
10130 DATA 82,255,69,89,255,84,87,81,5
7,255,48,55,255,56,60,62,70,72,68,255,
255,71,83,65,-1
20000 REM
20010 REM BELOW IS THE COMMAND TABLE
20020 REM THE FORMAT OF THE TABLE IS
20030 REM (KEY)(COMMAND)[:COMMAND:...:
COMMAND](@) WHERE THE
20040 REM '@' SYMBOL IS THE TERMINATOR
20050 REM The set must end with 5 '@'
signs.
20060 REM Only capital letters and num
bers can be used!!! for (KEY)
20070 REM
20080 REM
20090 REM
20100 DATA ACOLOR @,CCHR$(@,DDATA @,FF
OR @,GGOTO @
20110 DATA HGOSUB @,IINPUT @,JDRAWTO @
,KGRAPHICS @,LLIST @
20120 DATA MLPRINT @,NNEXT @,OPADDLE(@
,PPLOT @,QPOS. @
20130 DATA RRETURN @,SSO. @,TTHEN @,UR
EAD @,VSE. @,WSTICK(@
20140 DATA XSTRIG(@,YSTR$(@,2LOAD "D:@
,3SAVE "D:@
20150 DATA 4LIST "P:"@,5LIST "D:@
20160 DATA 0DEC=(HEX$(I\I)<="9")*(ASC(
HEX$(I\I))-48)+(HEX$(I\I)>="A")*(ASC(H
EX$(I\I))-55)@
20170 DATA 6ENTER "D:@,@@@@@
30000 REM
30010 REM
30020 REM
30030 REM Below is the appendage for a
n autorun file.
30040 DATA 0,224,2,225,2,0,29
```

TYPO TABLE

Variable checksum = 132884

Line num range			Code	Length
50	–	180	ET	423
190	–	290	KZ	527
300	–	410	EC	483
420	–	530	HP	313
540	–	10060	XQ	541
10070	–	10120	IH	580
10130	–	20100	TD	411
20110	–	30040	RG	427

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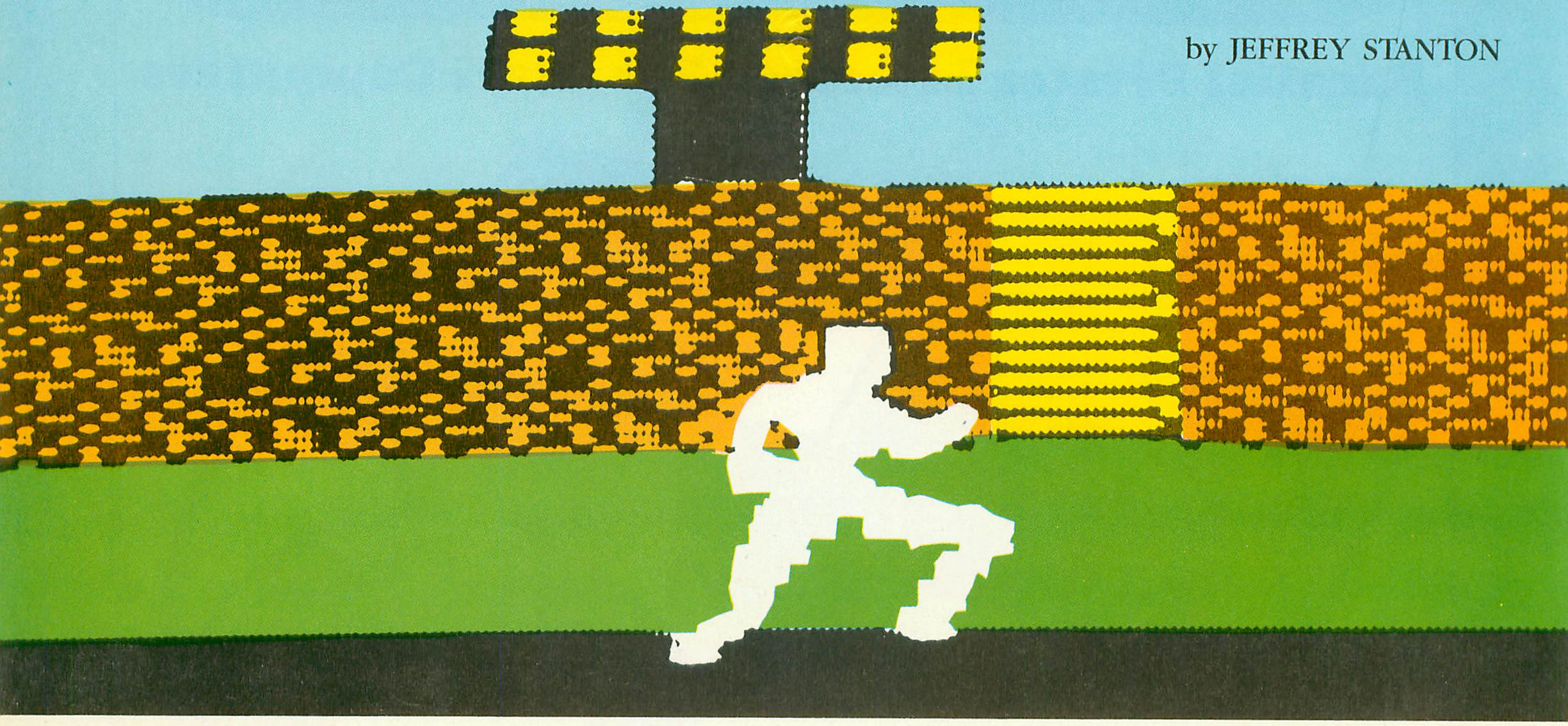
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game of the month

OLYMPI

by JEFFREY STANTON



SYNOPSIS

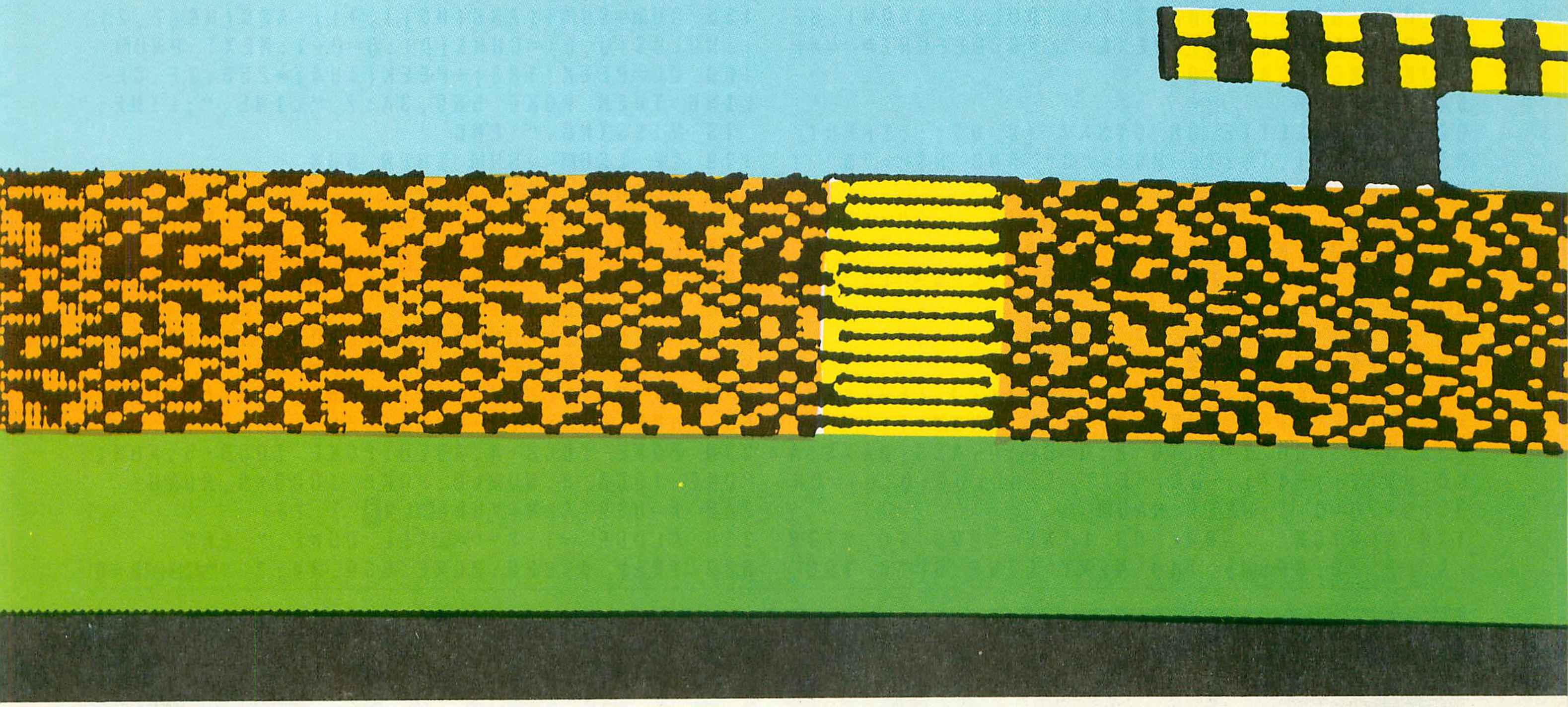
*This simulation of the 100-yard dash is **Antic**'s first machine language action game. The BASIC language listings create the machine language program. It's a two-player game requiring two joysticks, and runs on all Atari computers and all memory configurations. Antic Disk Subscribers: From DOS Type L [RETURN] then type DASH.EXE.*

Are you an armchair athlete? Has all the excitement over the Summer Olympics in Los Angeles got your blood pumping in the competitive spirit? Well, thanks to Jeffrey Stanton and **Antic**, you can now take part in a video 100-yard dash with two independently scrolling screens — and become the Olympic Atari champion of your block!

To use Olympic Dash, follow these instructions:

1. Type in Listing 1.
2. Check it with TYPO.
3. Delete the lines containing TYPO before saving the final copy.
4. SAVE a copy.
5. Type NEW to clear computer memory.
6. Type in Listing 2. There's no TYPO program for Listing 2 because all the data in Listing 2 is checked by Listing 1 as it reads the data and stores it in memory.
7. Use the LIST command to store Listing 2 (i.e. LIST"C:" or LIST"D:LIST2.LST").
8. LOAD Listing 1.
9. ENTER Listing 2 to merge the two.
10. RUN the program.
11. The program asks whether you're using cassette or disk. If you're using cassette, type [C] and [RETURN], and the program will generate a boot cassette. If you're using disk, type [D] and [RETURN]. The program will produce a binary DOS file named DASH.EXE.
12. After you respond to the first prompt, the screen will go black (for faster processing) for a few minutes while the program reads data and places it in a string. If the program encounters any bad data, which probably means you've made a typing error, the screen color returns to blue and the program prints a message telling you which line contains the bad data. Correct your error and RUN the program again. (Pay attention to commas, periods, and spaces.)
13. While you're waiting for the data to be read, cassette users place a blank cassette in the recorder and press Record and Play. Disk users should make sure there's a DOS disk with at least 28 free sectors in your drive.
14. When the screen color returns to blue, you'll see a prompt to press [RETURN] to save the file. Cassette

C DASH



users must press [RETURN] twice; once at the prompt, and once after the computer beeps twice. Do so, and the file will be stored.

15. To load the machine language cassette, rewind the tape, press [PLAY] and turn off your computer. It's not necessary to remove the BASIC cartridge. Then, while the computer is off, press [START] and hold it down while turning on the computer. Then press [RETURN] to load the tape. When the program has loaded, it will automatically begin.
16. To load from disk, go to the DOS menu, and use option L to load DASH.EXE. The program automatically starts upon loading.
17. If you wish to have the program load and run automatically upon booting the disk, rename the game program to AUTORUN.SYS and make sure that DOS.SYS exists on the disk.

HOW TO PLAY THE GAME

Playing Olympic Dash is easy. A word of precaution: This game is a joystick buster! If you have any choice, use your old Atari joysticks to play—they'll work fine, and present less of a problem if they break.

To play, plug two joysticks into Ports 1 and 2. Player 1 is represented on the top half of the screen, and Player 2 is on the bottom. Press [SELECT] to choose the speed of the race; fast or slow (shown in the upper right corner of the screen). Press [START] to begin the race. Watch the upper right corner for the traditional starter's cry of "On your mark . . . , Get set . . . ," and listen for the pistol shot when "Go" appears. Then start moving your joysticks from side to side (not up and down) as fast as possible. The faster you wiggle the stick, the faster your player runs. The first to cross the finish line is the winner. Total running time for both players is constantly displayed. If another player isn't handy, try to beat your own best time.

Jeffrey Stanton has a Bachelor's and a Master's degree in mechanical engineering from Rensselaer Polytechnic Institute. In 1979, he bought an Apple computer and began designing and writing video games, but he soon switched over to Atari computers because of their superior graphics capabilities. He is co-editor of The Book of Atari Software *and co-author of a new book,* Atari Graphics and Game Design, *both from The Book Company, Los Angeles, California.*

continued on next page

Listing 1

```
10 REM OLYMPIC DASH
20 REM BY JEFFREY STANTON
30 REM ANTIC MAGAZINE
40 DIM H$(2),ARRAY$(96),HOLD$(3500),HE
X$(23),FILE$(20):HEX$="@ABCDEFGHI#####
##JKLMNO":CASS=0
50 TRAP 60
60 ? "CASSETTE OR DISK? (C/D)";:INPUT
H$:H$=H$(1,1):IF H$<>"C" AND H$<>"D" T
HEN 60
70 TRAP 500:? "↖PLEASE WAIT....":FOR D
=1 TO 200:NEXT D:POKE 559,0
80 IF H$="C" THEN CASS=5:FILE$="C:":CM
D=128:GOTO 100
90 FILE$="D:DASH.EXE":CMD=0
100 RESTORE 1990+CASS:Q=1
110 READ ARRAY$:FOR HNUM=1 TO LEN(ARRA
Y$) STEP 2:H$=ARRAY$(HNUM,HNUM+1)
120 D=0:FOR I=1 TO 2:D=D*16+ASC(HEX$(A
SC(H$(I))-47))-64:NEXT I:HOLD$(Q,Q)=CH
R$(D):Q=Q+1:NEXT HNUM
130 RESTORE 2000:FOR LINE=2000 TO 2770
 STEP 10:GOSUB 140:NEXT LINE:GOTO 190
140 READ ARRAY$,LSUM:FOR HNUM=1 TO LEN
(ARRAY$) STEP 2:H$=ARRAY$(HNUM,HNUM+1)
150 D=0:FOR I=1 TO 2:D=D*16+ASC(HEX$(A
SC(H$(I))-47))-64:NEXT I
155 SUM=SUM+(ASC(H$(1,1))+ASC(H$(2,2))
):HOLD$(Q,Q)=CHR$(D):Q=Q+1:NEXT HNUM
160 CL=PEEK(183)+PEEK(184)*256:IF CL<>
LINE THEN POKE 559,34:? "LINE ";LINE;"
 IS MISSING.":END
170 IF LSUM<>SUM THEN 500
180 RETURN
190 POKE 559,34:? "↘↖PRESS <RETURN> TO
 SAVE THE FILE.":INPUT H$
200 CLOSE #1:OPEN #1,8,CMD,FILE$:IOCB=
848:POKE IOCB+2,11
210 ADDRESS=ADR(HOLD$):ADHI=INT(ADDRES
S/256):ADLO=ADDRESS-ADHI*256
220 BYTES=LEN(HOLD$):NUMHI=INT(BYTES/2
56):NUMLO=BYTES-NUMHI*256
230 POKE IOCB+4,ADLO:POKE IOCB+5,ADHI:
POKE IOCB+8,NUMLO:POKE IOCB+9,NUMHI
240 X=USR(ADR("hhh▣LVd"),16)
250 CLOSE #1:? "↖↘ALL DONE.":END
500 TRAP 40000:POKE 559,34:? "↖↘↓↓BAD
```

```
DATA AT LINE #";LINE:END
1990 DATA FFFF001D8C2A
1995 DATA 001CEE1C0000A9008D4402A9FF85
084C0F23
```

TYPO TABLE

```
Variable checksum = 720999
   Line num range      Code   Length
   10      - 120        GK     613
   130     - 200        GR     535
   210     - 1995       QL     336
```

Listing 2

```
2000 DATA 0000000000010306040404060200
01010303030206060C0C1830F0C08000000000
0000000003070C0C08080808,4554
2010 DATA 000101030303030303FFFE808000
00000000000000000000010306060202030101
0101014363F39F0F06000000,9125
2020 DATA 0000000000000000000000010101
010101010000000000000081C17130000000000
000000000000000000000001,13493
2030 DATA 0302060602020200000000000000
01010101000001010100000000000000030705
0D0C04070701010103030307,17934
2040 DATA 06060406060C1838103000000000
00000000000000000000000000000000000000
000000000000000000000000,22325
2050 DATA 0000000000000000000000000000
00000000000000000000000000000000007070
707060E0F0F0F8E8EFE7C0C0,26912
2060 DATA E0F0F0B81C0E0703010101010000
000000007070707060E0F0F0F8E8ECE4C6C2E0
F0F89C9E0703010100000000,31790
2070 DATA 00000000007070707060E0E0F0F0
F0F0D0D0D0F0F0F0B018181C0C0C0C0C0C0C0C
0C0600007070707060E0E0F0,36712
2080 DATA F0F0F0F8E8C8C8E0E0E0606070F0
F0706060606060700000707070706060E0F0F0
F0F8ECEEC2F0F8FCE6666266,41793
2090 DATA FCF86060C0C08080C00000707070
7060E0E0F1FBFEECC0C0E0F0FC9F9F07010303
0206060C0C06000000000000,46747
2100 DATA 0000000000000000000000000000
00000000000000000000000000000000000000
000000000000000000000000,51067
2110 DATA 0000000000000000000000000000
00000000000000000000000000000000000000
00000000000080808080C0C0,55457
2120 DATA C0E0000000000000000000000000
00000000000000000000008080C0C060503000
000000000000000000000000,59885
2130 DATA 0000000000000000000000000000
00000000000000000000000000000000000000
000000000000000000000000,64205
2140 DATA 0000000000000000000000000000
00000000000000000000000000000000000000
000000000000000000000000,68525
2150 DATA 0000000000000000000000000000
80808000000000000000000000000000204060
80A00020406080A000204060,72955
2160 DATA 80A0000000000000000000000000
00000000000000000000000000000000000000
000000000000000000000000,77300
2170 DATA 0000007070704600354214355600
3456003356003256003156003056002F56002E
56002D56002C56002BC63C35,81978
2180 DATA 5600345600335600325600315600
3056002F56002E56002D56002C56002B465035
41902A000000002F2C392D30,86681
2190 DATA 2923002435212C00000000253625
2E34000D001110100002D25342532002421332 8
000000000000000000000000,91205
2200 DATA 000000000000302C213925320011
000000000010100E10100000302C2139253200
12000000000010100E101000,95682
2210 DATA 002F2E00392F353200 2D21322B00
0000272534003325340000000000000000272F00
000000000026212C33250033,100275
2220 DATA 342132343C1E19140F0B09080706
05040303020202020200000000000000000000
000909090909080707070606,104859
2230 DATA 0606050505050504030305050404
04040303030605050505050403030010001110
001210001310001410001510,109328
2240 DATA 0016100017100018100019100011
10100002030507081012131517182022232527
283032333537384042434547,113863
2250 DATA 4850525355575860626365676870
72737577788082838587889092939597980000
00000000000000FFFFFFFFFF,118750
2260 DATA FFFFFF5A11A5DA246B54A561A45B
ACD26B4BB5666666006666660000FF00FF00FF
00FF18181818181818184259,123864
2270 DATA 204A4546465245592053544 14E54
4F4E33252C2523340D332C2F370033252C2523
340D26213334003032253333,128633
2280 DATA 0003334213234000000000000000
00000000000004020201020101010101010101
010001010101010101000100,133009
2290 DATA 0100010100010001000100010001
00000100010001000001000001000100000000
010000000100000001000001,137347
2300 DATA 0000000100000000010000000001
00000000010000000000010000000000010000
000000010000000000010000,141675
2310 DATA 0000000001000000000000010000
00000000010000000000000100000000000302
03030403040400000103060A,146052
```

continued on next page

```
2320 DATA ØF151C24ØØ2DØØØØØØ3892949698
47ØØØØØØØØ5BØØØØØØØØ74ØØØØØØØØØØØØØØØØ
ØØØØØØØØØØØØØØØØØØØØØØØØ,15Ø56Ø
2330 DATA ØØØØØØØØØØØØØØØØØØØØØØØØØØØØ
ØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØØ
ØØØØØØØØØØØØØØØØØØØØØØØØ,15488Ø
2340 DATA ØØØØØØØØØØØØØØØØØØØØØØØØØØØØ
ØØØØØØØØØØØØØØA92385Ø3A92385Ø2A9Ø285Ø9
A9ØØ8D44Ø24C74E4A2ØØBDØØ,159523
2350 DATA 2Ø9D9Ø2AE8EØ4EDØF5A99Ø8D3ØØ2
A92A8D31Ø2A9388DØ7D4A9Ø38D1DDØA93E8D2F
Ø2A9Ø18D6FØ2A9ØØ8DØ8DØA9,164662
2360 DATA ØC8DCØØ2A94E8DC6228DC7228DFØ
228DF1228DØØDØA93Ø1869258DCE228DD622A9
881869258DCF228DD722A9ØØ,169794
2370 DATA 8DØ9DØA9ØC8DC1Ø2A9568DC8228D
C9228DØ1DØA93Ø1869258DDØ228DD822A98818
69258DD1228DD922A9ØØ8DØA,1749Ø1
2380 DATA DØA9ØC8DC2Ø2A95E8DCA228DCB22
8DØ2DØA93Ø1869258DD2228DDA22A988186925
8DD3228DDB22A9ØØ85CØA938,18ØØ52
2390 DATA 85C1AØØØ98A2Ø891CØC8DØFBE6C1
CADØF6A9ØØ85FE85FCA93885FFA9EØ85FDA2Ø2
AØØØB1FC91FEC8DØF9E6FDE6,18537Ø
2400 DATA FFCADØF2AØØØB98521990038C8CØ
399ØF5A9388DF4Ø2A9ØØ85F6A92B85F7AØØØ98
A2ØA91F6C8DØFBE6F7CADØF6,19Ø58Ø
2410 DATA AØØØB94E2Ø99ØØ35C8CØ649ØF5A2
Ø5AØØØB927219DØØ2BE8C8B927219DØØ2BE8C8
B927219DØØ2BE8C88A1869ØC,19563Ø
2420 DATA AAEØAØ9ØDF2ØØ42AAØØØB9BD2138
E92Ø99AA2BC8CØ129ØF2A9E68DØØØ2A9278DØ1
Ø2A9CØ8DØED4A9ØØ8DØE238D,2ØØ755
2430 DATA Ø2238DEØ228DE1228DE6228DE722
8DE8228DE9228DEA228DEB228DE2228DE3228D
EC228DED228DF6228DF7228D,2Ø5977
2440 DATA F8228DF922A9ØF8DFA228DFB22A9
AE8DF2228DF3228DØC23A9Ø18DØØ238DØ1238D
ØA238DØB23A9Ø58DDE228DDF,211183
2450 DATA 22A9288DC4Ø2A9C68DC5Ø2A97A8D
C6Ø2A9468DC7Ø2A9ØØ8DC8Ø22ØØ4282Ø49282Ø
8E28A9Ø7A227AØ732Ø5CE4A9,216228
2460 DATA 8Ø8514A514DØFC4C5125AD1FDØC9
Ø6FØ5ØAD1FDØC9Ø5DØF2ADØE23FØ1EAØØBB9DB
21992E35881ØF7A9ØØ8DØE23,221381
2470 DATA AØØ8B91E2199ØC21881ØF74C6C25
AØØBB9CF21992E35881ØF7A9Ø18DØE23AØØ8B9
1521990C21881ØF7A9DØ8514,226412
2480 DATA A514DØFC4C2Ø25AØØBB9E721992E
35881ØF7A9ØØ854DA9DØ8514A514DØFCAD1FDØ
C9Ø6DØF9A9ØØ8514A514C978,231534
2490 DATA DØFAAØØBB9B22Ø992E35881ØF7A9
ØØ8514ADEØ22DØ2DADE122DØ28A514C95ADØFØ
AØØBB9BE2Ø992E35881ØF7A9,236676
2500 DATA ØØ8514ADEØ22DØØEADE122DØØ9A5
14C95ADØFØ4C3626AØØBB9D62Ø992E35881ØF7
A2Ø1BDEØ22FØØFFEDE22FEFØ,241833
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5
```

RAINBOW WALKER

Synapse Software
5221 Central Ave.
Richmond, CA 94804
(415) 527-7751
$34.95, 32K — disk
$34.95, 32K — cassette

Reviewed by Andrew Bell

Rainbow Walker, Synapse Software's latest arcade-style game, joins the company's previous games as one of the most imaginative, graphically stimulating and playable games on the market.

The story is colorful. Once, in a mythical land, a merciless meanie stole all the colors from the rainbow. Wearing magic shoes, brave Cedrick tries to restore the colors piecemeal by hopping from square to square on the dulled rainbow. Wherever he lands, Cedrick leaves a patch of color; hopefully the arc will be returned to its original colors.

Unfortunately for Cedrick, there are some monochromatic-minded creatures who materialize to undo his work. Wherever these creatures land, color disappears.

You control Cedrick by using the joystick to hop in eight directions; pressing the fire button, you can take two-square giant steps. When you color an entire rainbow you advance to the next level. There are 20 levels, each progressively harder, with a surprise if you make it to the top level.

As you move up, the rainbows' shapes become more complex, and new, more aggressive antagonists appear. Fortunately, after each round you can supplement your stock of extra lives by playing the bonus screen, a set of three squares that move first slowly, then faster and faster. The longer you can keep Cedrick on the squares, the more lives you earn. *(This is a great way to test your reflexes and acquired skill.* —ANTIC ED*)*

Rainbow Walker excels graphically. The rainbow is shown in unique perspective, cutting the horizontal plane at the bottom of the screen and arching back to the horizon. This is a three-quarter look down at the bow's floor-like tiles. When Cedrick reaches the bottom of the screen and hops forward, the tiles scroll back and a new set of squares comes into view. Hopping toward the top of the screen, Cedrick shrinks in the distance, making the image appear three dimensional.

Rainbow Walker's sound complements the game without becoming obnoxious. The many sound effects are so well meshed with the action that they contribute to the game's overall high quality of play.

The game is hard to play at first, but after a little experience and some determined effort, you will be able to advance to higher levels and improve your scores. Rainbow Walker has ample action and surprises, making it challenging to even the most sophisticated game player. If you're looking for gold, you won't have to go to the end of the rainbow to find it in this game.

THE SEVEN CITIES OF GOLD

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
$40.00, 48K — disk

Reviewed by Sandra Carlisle

The Seven Cities of Gold is a role playing simulation of the 16th Century Spanish discovery and conquest of the New World. You are a Spanish conquistador leading an expedition through unexplored dangers in search of treasure and glory.

You may face complete panic when you're out of food and goods and can't find your way back to your ships. If you discover and enter a village, you find yourself surrounded by natives. At first you feel frightened — there are so many, crowding too closely.

The subtlety of this game becomes especially apparent when you must deal with the natives. There is no common language. How do you communicate with a totally alien culture? You can slaughter and plunder, try trickery or treachery, trade for your most pressing needs, or even try to convert the natives and establish missions. These many variables give the game its authenticity, flavor, and challenge.

As you move about, the detailed terrain scrolls by you, demonstrating the game's excellent graphics and animation.

Your expedition is financed by the king, including four ships and their crews, soldiers, food and trading goods.

The strategy and challenge of this one-person arcade-style game are evident as you explore unknown territory.

Seven Cities is highly realistic as a historical and geographical simulation.

If you defeat or trade with the natives, you may have many native bearers. They not only help carry supplies and gold, but also help to locate other villages and gold mines. Your expedition can move at different speeds on land, and much faster on rivers.

Seven Cities has three playing levels. At any level above novice, you must contend with storms at sea, native ambushes, food spoilage, ship wrecks, and even with the disappearance of your ships. Also, the native villages are hidden and can be located only by stopping to look for a "sign." The higher the level, the more realistic the play.

Considering the size of this game (the "game" map alone occupies 65K of disk memory — 2,800 screens!), I was amazed by the speed of the play. I never had to wait for the drive to load the next

map portion. Ozark Softscape, the designers, developed a technique to load new portions of the scrolling map without interrupting the play of the game.

The "Random World" generator is an impressive feature of the game. This will create (and write to a disk) as many unique "New Worlds" as you want (all with 2,800 screens), each with different shaped land masses, swamps, villages, mountains, and so on. This sophisticated technique follows established geological rules of plate-tectonics and consults a cultural dissemination model for its work. You can even make copies of your unique world and exchange them with your friends for "competitive" play.

Upon your return, you can go to the Outfitters Shop to outfit more ships for future expeditions. You can also visit the Royal Palace to receive recognition for your success, you can view the game map, or drop into the Pub to save the game.

Since Seven Cities is highly realistic as a historical and geographical simulation, it can be used quite easily as an educational tool. There is no set solution, nor is there a single puzzle to solve.

Best of all, the concepts of entertainment and education are totally integrated. Seven Cities will undoubtedly be a strong contender for game of the year in 1984.

PITFALL!

Activision, Inc.
2350 Bayshore Frontage Road
Mountain View, CA 94043
(415) 960-0410
$34.95, 8K — cartridge

Reviewed by Ellen Keyt

Deep in the jungle, far away from technologized, urbanized civilization, lives (for a short time at least), Pitfall Harry. This daring jungle explorer has fearlessly entered the dense foliage in search of the fabled treasure concealed within. Leaping over alligators, rolling logs, scorpions and snakes, he spots his first goal, a gold bar. He runs across the clearing to retrieve it, only to fall to his demise in a huge tar pit.

This may be the most common scenario in one of the most popular games from Activision. Originally written by David Crane for the VCS, this fast action game has finally been released for Atari computers. Every detail featured in the VCS version has been reproduced and as far as graphics are concerned enhanced. Details are very lifelike: Pitfall Harry lopes across the screen in long, easy strides; the scorpion's pincers clutch at Pitfall Harry; barrels roll realistically across the screen, and a vine swings in a smooth, unbroken arc. The animation of all the assorted creatures is excellent, and the joystick responds instantly, preventing "Slip of the Wrist" deaths.

Almost everything about **Pitfall** is precise and perfect. Although there is usually plenty of time to finish a game, the absence of a pause is annoying. The graphics are 3-D and very realistic, but the game would be improved greatly if the player were allowed to move in and out of the third dimension. In addition, I miss a choice of difficulty function, and, since the game was not designed to eat up quarters at a video arcade, the twenty-minute time limit is entirely unnecessary. In spite of these faults, Pitfall is still exciting, and will greatly please the young arcaders who have long been waiting for the game's release.

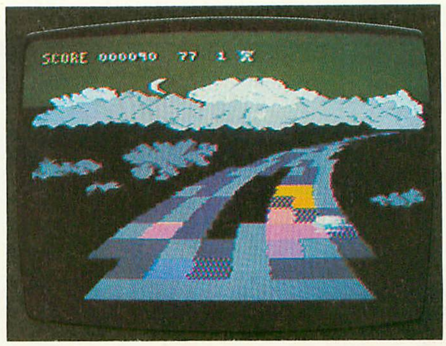
DROL

Broderbund Software
17 Paul Dr.
San Rafael, CA 94903
(415) 479-1170
$39.95, 48K — disk

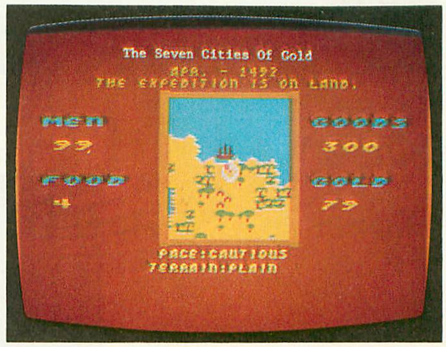
Reviewed by Brian Ho Fung

Drol is an original, addictive, arcade-style game with beautiful graphics. The game takes you to the underground dream world of Drol, where you must rescue a small family and its pets

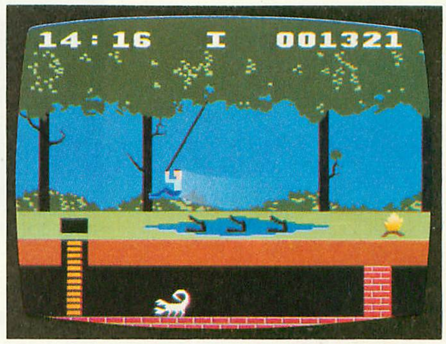
continued on page 80



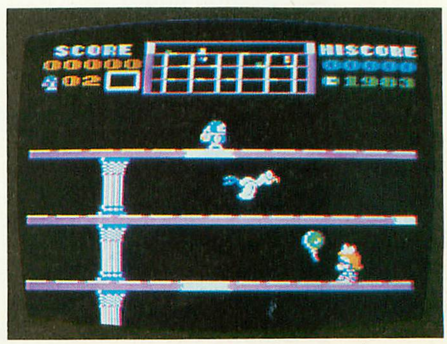
RAINBOW WALKER



SEVEN CITIES OF GOLD



PITFALL!

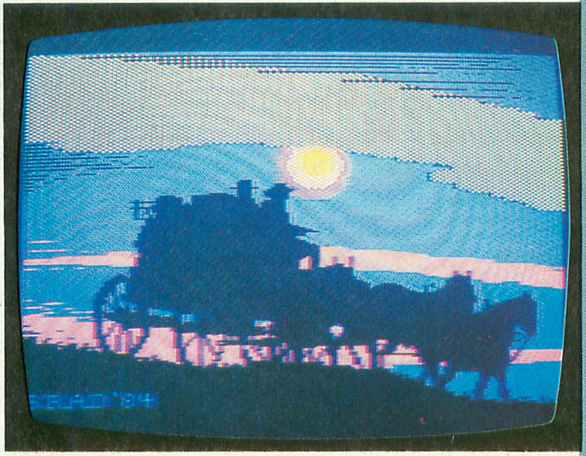


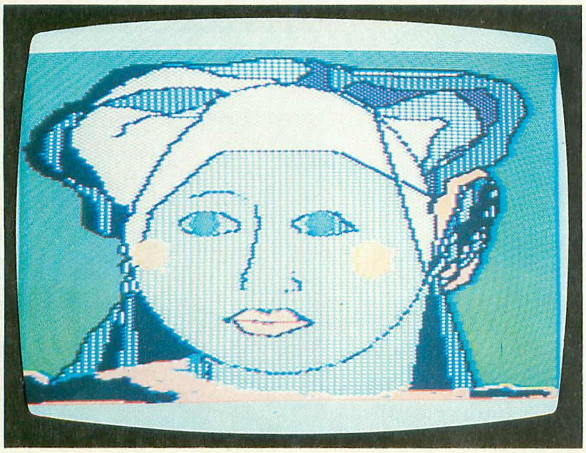
DROL

microscreens



Cheetah


Stagecoach


Atarian

Here's an extra-big bonus MICROSCREEN section for **Antic**'s 1984 Graphics issue. We're happy for the opportunity to print more than our usual amount of the outstanding pictures we get from our readers.

George R. Bradford (Cheetah, Stagecoach) is a Canadian commercial artist. He places a transparent overlay on his video screen and then makes computer images using either Micro-Painter or Keystroke Artist, a joystick graphics program which appeared in **Antic** August 1983. Mr. Bradford is 51 and says he "just hates to let the young folks have all the fun."

Dorit Tabak of Manhattan (Atarian) is an art student who has owned her Atari 800 for only six months. She made this Picasso-like portrait using a KoalaPad with Micro Illustrator and "a little help from Graphic Master."

microscreens

Jeff McFall (Voyage) lives in Columbus, Indiana and created this South Seas nightscape with Micro Illustrator on KoalaPad.



Voyage

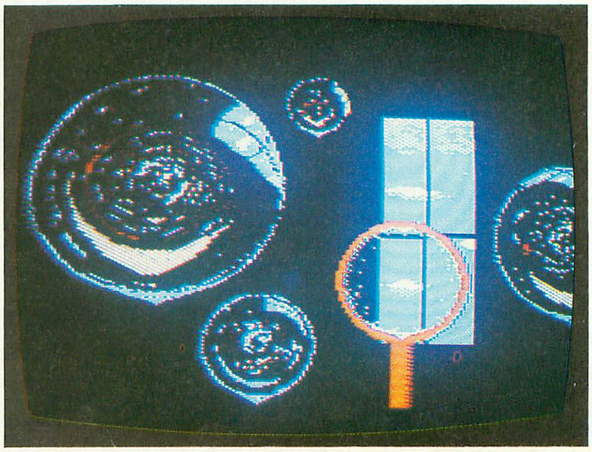
Armand Deveno (Red Ballons, Bubbles) creates his precise and colorful illustrations with KoalaPad and Micro Illustrator. He lives in Springfield, Mass.



Red Balloons

You can create an outstanding picture on your Atari even if you've never been able to draw a straight line before. With the latest under-$100 touch tablets, light pens and drawing software anybody can now express their artistic visions via computer. You'll also receive fine results using the graphics programs published in **Antic**, such as Keystroke Artist (August 1983) and this current issue's Price's Color Picture Painter and Easy Graphics Converter.

You get an Antic T-shirt if we publish your computer art on the Microscreens page. Send pictures to Antic on disk, along with loading instructions plus a short note telling about yourself and which graphics tools you use . . . also include your two choices of T-shirt size and color.



Bubbles

trapped in the fantasy world by an evil witchdoctor's curse.

You are equipped with an anti-gravity rescue suit and an unlimited supply of reality pellets. Drol has three missions: rescue a wandering girl and her jet-propelled pet lizard; save her propeller-beanied brother and his pet crocodile; and liberate the kids' mother, who is bound with rope on Drol's bottom floor.

Your hero, controlled by the joystick, travels through continuously scrolling multi-levelled corridors seeking captives and trying to avoid a host of dangers—giant scorpions, monsters, flying turkeys and a killer vacuum cleaner. When you find a captive, you simply touch it to rescue it.

Your hero starts with five lives. Completing three missions, one round, earns you an extra life. Each time your hero dies, he must start from the top corridor. This can be frustrating, especially on the third mission where each corridor is separated by only one or two trapdoors placed far away from each other. Each new round provides faster and deadlier monsters—some of which must be shot repeatedly before they die.

Drol is an exceptionally well-programmed game. It has staying power and a limitless challenge. It can be paused; you can view the high scores while playing, and high scores can be saved to the disk. Drol's one drawback—the long time it takes to load each successive mission—is offset by the game's beautiful animation, smooth-scrolling graphics and non-stop action. Droll will delight players of all ages and will challenge even skilled game players.

CARRIER FORCE

Strategic Simulations, Inc.
883 Stierlin Road, Building A-200
Mountain View, CA 94043-1983
(800) 772-3546
$59.95, 40K — disk

Reviewed by Christine A. Lunardini

Historic accounts of great World War II naval battles need little embellishment to emphasize their drama. The stakes were enormous in both theaters of the war, but the outcome for the American forces was nowhere so uncertain as it was in the Pacific in 1942. With **Carrier Force**, Strategic Simulations, Inc., has recreated four major battles of the Pacific (Midway, Santa Cruz, the Solomons, and the Coral Sea), with all the tension, excitement, complexity, and uncertainty that accompanied the actual conflicts between the American fleet and the Imperial Japanese Navy.

Carrier Force simulations are very realistic. Gary Grigsby and his creative

the hard-core science fiction fan. Good news, fellow rocket-rangers! Omnitrend's **Universe** has arrived.

This game takes place some time after man's colonization of a galaxy called the Local Group. All contact with Earth has stopped. At the same time evidence has appeared which hints of the existence of an alien artifact, believed to be a hyperspace booster. As a citizen of the Local Group, you must find this mysterious booster and use it to find out what's happened to the people on Earth.

Rather than beginning the game by endowing your character (or yourself) with characteristics, such as strength and dexterity, you borrow 300,000 credits from the Central Bank of Axia (your starting point). With this money you go on to purchase equipment for

Good news, fellow rocket-rangers! Omnitrend's Universe has arrived.

mining, trade, or piracy, all of which you use as a means of survival while on your quest. You quickly find that the easiest way to make money with the least amount of risk is trade and passenger transport. You buy goods and pick up passengers on one planet, and deliver them to a planet of lesser sophistication. As you increase your wealth, you upgrade your equipment and explore the outer reaches of the Local Group, all the while searching for the missing booster.

Many facets of Universe make it a remarkable game, but the main one is its sheer depth of gameplay. Universe is the first Atari game to come on four disks. Included with them is documentation of over 80 pages! The folks at Omnitrend tell me the game takes well over 100 hours to complete, making it one of the better values around. Another first is that Omnitrend has set up a bulletin board that players can access for help. The nitty-gritty action happens after four years of game time play so players can learn the game's fine points before the action gets hot.

Universe does, however, have some serious flaws. It requires a LOT of disk swapping with a one-drive system. The programmers have included a handler for a second drive in the new revision, available now. Also, the game is too slow.

Omnitrend's Universe is a good game that could have been outstanding with a little more polishing. But if you are in the market for a science-fiction strategy game that has more depth than the average adventure, **and** that will take several months to complete, then Universe is the ideal addition to your game library.

ATARI BASIC FASTER AND BETTER

by Carl M. Evans
I J G, Inc.
1953 W. 11th Street
Upland, CA 91786
(714) 946-5805
$19.95

Reviewed by Jerry White

Atari BASIC Faster and Better is a 300-page wealth of information. I recommend it highly to those who use BASIC beyond the beginner level. It is a useful addition to the libraries of both the hacker and advanced programmer.

This book contains more subroutine and demonstration program listings than any other book currently available for Atari computers. The BASIC and machine language subroutines are designed to be easily incorporated within the reader's programs. All subroutines and demo programs are also available separately on diskette.

The printing is top quality and easy to read. The book includes a detailed table of contents, which, along with an index, makes it an excellent reference. The appendixes supplement the index by listing subroutines alphabetically and by line number. They also list assembly language routines, application programs, and demonstration programs for each chapter.

The first four chapters of this book cover programming techniques such as USR subroutines and memory management. This information is logically necessary for implementation of the routines found in later chapters. Chapters five through fifteen contain hundreds of subroutines, tricks, and concepts. The presentation avoids technical manual computer jargon, and uses clearly defined charts and demonstrations. The novice assembler programmer will benefit from the commented source code listings, yet a knowledge of

This book contains more subroutine and demonstration program listings than any other book currently available for Atari computers.

machine language is not needed to use these routines in your BASIC programs.

Some of the topics covered include string manipulation, date and time subroutines, Boolean logic, formatting data entry, display tricks, sound effects, disk utilities, and much much more. The book also contains the most detailed explanation of Atari's error codes that I've ever seen.

If you write BASIC programs on your Atari computer, you will want to keep **Atari BASIC Faster and Better** near your keyboard. This is one book that will not wind up sitting on a shelf, gathering dust.

(Note: IJG has provided ANTIC with a number of these books, which we are selling for $15.95. We will accept your cheque, or you can charge it to your MasterCard or VISA.—ANTIC ED)

product reviews

team accounted for virtually every piece of equipment on both sides. As fleet commander of either the U.S. Navy or the IJN, your first duty is to find the opposing fleet. Then you must determine the most effective way to disperse the ships in your command. These include carriers, destroyers, tankers, escorts, and submarines. Aircraft, ranging from B-26 heavy bombers, and F4F fighters to minimally-armed reconnaissance planes, also must be strategically deployed. How many should you place on aircraft carriers and runways? And how far from shore can a strike force proceed before you risk the danger of having to ditch, thus losing valuable men and planes?

Such decisions continually must be made throughout the game. As commander, you are given current and detailed weather and fleet information. You know the location, heading, strength, readiness, damage, armament, and base capability of each fleet task force, reconnaissance plane, and strike force. Task force size, location, and the enemy's attack plan are the unknown factors adding to the realistic tension as you develop your strategies, launch your strike forces, and cross your fingers.

Carrier Force has recreated four major battles of the Pacific with all the tension, excitement, complexity, and uncertainty that accompanied the actual conflicts.

In addition to fleet information, the program features a high-resolution scrolling map with the appropriate island configuration for each scenario. As task forces are sighted, they are represented on the map by colored symbols. As in real sea chases, a task force located during one search can change direction or disappear under thick cloud cover. You know it is somewhere in the area, but where? Meanwhile, your radar report indicates an approaching strike force of approximately 150 planes headed for one of your bases. Your next set of orders may well decide the battle.

Carrier Force is an advanced strategy game that is easy to play. The only real frustration I found was with the game's documentation. It is very poorly organized, making it difficult to use effectively during game play. It is also poorly edited. For example, the game's list of abbreviations, which is potentially helpful, is incomplete and is not alphabetized. You must read through the entire list to locate the term you are seeking. Though the game comes with two laminated map boards which are quite handy for tracking both fleets, a similar card summarizing important play information (i.e., aircraft capability, pilot endurance, base operation limits, etc.), was not included. Once you have mastered the play techniques, however, these are minor inconveniences in an otherwise excellent game.

NATO COMMANDER

MicroProse
10616 Beaver Dam Road
Hunt Valley, MD 21030
(301) 667-1151
$34.95, 48K — disk
$34.95, 48K — cassette

Reviewed by Edward Bever

Right now, nine Warsaw Pact armies confront nine NATO corps in central Europe. Even in these tense times, experts see little chance of nuclear war, but if one were to start, it would probably start here. You're in the hot seat; you're the NATO commander.

As the game begins, Soviet divisions attack Berlin and roll across the West German border. Urgent reports of fighting start coming in. You must set the missions of air wings and deploy ground troops while the enemy moves relentlessly forward. Your units also move automatically once you tell them where to go; play proceeds at a continuous pace.

Eastern Block units will attack when they come in contact with your troops, while you must carefully plot your own attacks. Your knowledge of the enemy's location is limited, and you must keep track of six variables simultaneously, scrolling across a board the size of four screens.

Overhead, the Allied air forces struggle for domination of the skies. If they succeed before Russian tanks break through, the invasion can probably be halted and peace restored. In any case, the fight will be dirty with chemical and conventional warfare.

This simulation puts you in command of the most dangerous military operation in history.

The nuclear genie may remain in its bottle, but then again, it may not. Both sides have tactical nukes. What will the Russians do if they meet exceptionally fierce resistance? What will we do if our air power cannot come through in time, as the Soviets close on our nuclear depots? What would you do?

NATO Commander lets you find out. Although the program does not always execute flawlessly, the game is exciting and exacting. The simulation puts you in command of the most dangerous military operation in history.

UNIVERSE

Omnitrend Software
P.O. Box 3
West Simsbury, CT 06092
(203) 658-6917
$89.95, 48K — 1 or 2 disk drives

Reviewed by Harvey Bernstein

In the past, role-playing games have been confined largely to the fantasy world of orcs, trolls, demons, and the like, with not much attention given to

continued on next page

product reviews

ADVANCED PROGRAMMING TECHNIQUES FOR YOUR ATARI

by Linda M. Schreiber
Tab Books, Inc.
Blue Ridge Summit, PA 17214
$14.50
$24.95, 32K — sample program disk

Reviewed by Matthew Ratcliff

Here is a book for the experienced Atari BASIC programmer. It will teach you how to use all of those special commands you've never quite been able to master. **Advanced Programming Techniques For Your Atari** covers some topics we have seen many times, such as Player/Missile graphics and character-set editing. But many other techniques are explained that have rarely been addressed in print. The author presents her subjects in detail, and gives many sample programs, including assembly language routines called by USR commands. Complete explanations of all programs are straightforward and easy to follow.

The book can be purchased with a Sample Programs Disk, and with all 62 sample routines just a LOAD away, you will find yourself learning much more quickly than if you had to type all that code and debug it. A few complete programs are presented as well, including a character-set editor.

Some assembly language routines are used, and the "source code" is provided. But if you wish to eventually make the jump to AL, this book will not help you much. Although the USR routines work nicely, the comments in the source code are cryptic. The comments tell you exactly what the AL command is doing, without giving you a clue to its purpose. Compare the two listings below. Both will result in the same "object code" (the bytes that the machine operates on), but which is easier to understand?

SAMPLE #1
(Typical for this book)

```
LDA #0        ;LOAD THE
              ACCUMULATOR WITH
              THE NUMBER ZERO
STA 77        ;STORE THE
              ACCUMULATOR AT
              LOCATION 77
```

SAMPLE #2

```
ATRACT=77 ; ATTRACT MODE
            MEMORY LOCATION
LDA #0      ; A VALUE OF 0 STORED
            HERE
STA ATRACT; RESETS THE ATTRACT
            MODE (POKE 77,0)
```

There are things in this book that I have only seen in *De Re Atari*, which is a bit on the technical side for those not familiar with AL. One of the major advantages of this book over magazines covering similar information, is that it consistently uses the same programming technique throughout. This is a real plus, provided you like the author's style. Her BASIC code is well structured and commented.

Some of the more interesting subjects covered include a Vertical Blank Interrupt routine that plays music continuously, even after the BASIC program has stopped, and sample code on page flipping. Below is a quick rundown on the book's table of contents.

- Number Systems
- The Display List
- Graphics
- Animation
- Inside BASIC
- Strings
- Display List Interrupts
- Scrolling
- Page Flipping
- Sound Generators
- The Keyboard
- The Screen Editor
- Disk Use
- Cassette Use

This book will certainly help you put into code many of those nifty programs that have been just too tough to tackle before.

product reviews

CODEWRITER

Codewriter Corp.
7847 North Caldwell Ave.
Niles, IL 60648
(312) 470-0700
$99.00, 48K — 3 diskettes

Reviewed by Joseph Kattan

Even if it's just for recipes, phone numbers or household inventory, most personal computer users will sooner or later want to have an easy database or home filing program. **Codewriter** is the Atari translation of a popular program written for the Commodore 64. Unfortunately, this latest entry in the Atari database management sweepstakes pretends it can generate programs to your specifications instead of adequately taking care of some basic needs of a home filing system.

You can only look up information by one key field. If you set up a phone directory with names as the key field, you would not be able to look up a record by entering the phone number.

The number of records you can save is also too small. In a simple 12-field application, Codewriter informed me that I could have no more than 211 records. This limit is not enough for many common database uses.

The Codewriter package comes with three disks. Disk 1 contains the data entry system while Disks 2 and 3 are used for creating reports. Atari owners will not be pleased to find that they get the Commodore instructions manual plus three pages of changes, which are needlessly duplicated on one of the disks.

Codewriter will allow you to store records in multiple fields, as many as 50 on a screen. But that is almost the full extent of what it can do as a database manager.

The program begins directly enough by letting you design an input screen identifying the fields of each application, with input-area masks plus prompts for entering field data.

But once you've designed the screen, your problems begin. Unless you've got a dual disk drive, Codewriter puts you through an obstacle course of swapping disks. The manual flat-out admits that "turning your design into a working program may take from 25 minutes to a bit over an hour." Not exactly the speedy, effortless operation claimed by this product's advertising.

Eventually all your work does generate a BASIC program — which is only slightly altered from Codewriter's standard format. I wrote several applications that all came out as pretty much the same program with only minor differences.

Each application took up 190 sectors on a single-density disk! You're entitled to expect a good database program to use disk space only for the data and essential information on field arrangement. In contrast, every Codewriter "program" gobbles up so much disk space that the manual recommends you put only one application per disk.

For those whose only experience with databases has been lower-priced products like Home Filing Manager or Microfiler, Codewriter might be the next step up. Its greatest redeeming value is that it will use any numeric function legal in Atari BASIC — letting you use it much like a spreadsheet.

Codewriter Corp. rates credit for offering the buyer a reasonably priced set of backup disks. The company also sells Disk 1 separately as Filewriter and Disks 2 and 3 as a package called Reportwriter.

continued on next page

listing conventions

Table Information

Our custom font listings represent each ATASCII character as it appears on the video screen. You generate some characters by a single keystroke, for example, the regular alphabet. Others require a combination or sequence of keystrokes. In this table, ESC means *press and release* the escape key before pressing another key. CTRL or SHIFT means *press and hold* the control or shift key while simultaneously pressing the following key.

The Atari logo key (人) "toggles" inverse video for all alphanumeric and punctuation characters. Press the logo key once to turn it on; press again to turn it off. In the XL line there is no logo key; inverse video is controlled by the Reverse Video Mode key. Decimal values are given as reference, and correspond to the CHR$ values often used in BASIC listings.

NORMAL VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	CTRL ,	0
	CTRL A	1
	CTRL B	2
	CTRL C	3
	CTRL D	4
	CTRL E	5
	CTRL F	6
	CTRL G	7
	CTRL H	8
	CTRL I	9
	CTRL J	10
	CTRL K	11
	CTRL L	12
	CTRL M	13
	CTRL N	14
	CTRL O	15
	CTRL P	16
	CTRL Q	17
	CTRL R	18
	CTRL S	19
	CTRL T	20
	CTRL U	21
	CTRL V	22
	CTRL W	23
	CTRL X	24
	CTRL Y	25
	CTRL Z	26
	ESC ESC	27
	ESC CTRL −	28
	ESC CTRL =	29
	ESC CTRL +	30
	ESC CTRL *	31
	CTRL .	96
	CTRL ;	123
|	SHIFT =	124
	ESC SHIFT CLEAR	125
	ESC DELETE	126
	ESC TAB	127

INVERSE VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	人CTRL ,	128
	人CTRL A	129
	人CTRL B	130
	人CTRL C	131
	人CTRL D	132
	人CTRL E	133
	人CTRL F	134
	人CTRL G	135
	人CTRL H	136
	人CTRL I	137
	人CTRL J	138
	人CTRL K	139
	人CTRL L	140
	人CTRL M	141
	人CTRL N	142
	人CTRL O	143
	人CTRL P	144
	人CTRL Q	145
	人CTRL R	146
	人CTRL S	147
	人CTRL T	148
	人CTRL U	149
	人CTRL V	150
	人CTRL W	151
	人CTRL X	152
	人CTRL Y	153
	人CTRL Z	154
	ESC SHIFT DELETE	156
	ESC SHIFT INSERT	157
	ESC CTRL TAB	158
	ESC SHIFT TAB	159
	人CTRL .	224
	人CTRL ;	251
	人SHIFT =	252
	ESC CTRL 2	253
	ESC CTRL DELETE	254
	ESC CTRL INSERT	255

COPY MATE

A fast, easy disk-sector copier

by MIKE PALMER

SYNOPSIS

*This self-booting disk-copy program copies an entire disk in two passes with 48K (or more) RAM, but works in as little as 16K. The main program listing is written in assembly language, and requires OSS's **MAC/65** or the Atari **Assembler Editor** cartridge. With Atari XL machines, the **Translator** disk is required to run the machine-language program generated from the assembled listing. **Antic** disk subscribers: follow directions in article.*

COPYMATE is a utility program that copies disks. It boots (loads itself) in three seconds and is ready for immediate use. The program is initialized with a set of pre-defined options that are displayed on the screen. You can change these default settings with the BASIC customizer program in Listing 2.

To create the working version of COPYMATE, type Listing 1 into the Assembler Editor or MAC/65 and assemble it to disk with the command ASM,, #D:COPYMATE.OBJ. Next, enter DOS and use menu option L to load COPYMATE.OBJ. (Before entering DOS, XL owners should boot Translator while pressing [OPTION] to disable BASIC.) As the file loads, hold down [OPTION] to run the routine that creates the boot file. Insert a newly-formatted blank disk into Drive 1 and press [RETURN]. In a few seconds, a working version of COPYMATE will be created and then booted automatically.

To load an existing version of COPYMATE, turn off your computer and remove all cartridges. (XL owners should boot Translator while holding down [OPTION] to disable BASIC.) Now put the COPYMATE disk in Drive 1 and turn on the computer (XL owners press [SELECT]).

Before starting a copy, you can change any of the displayed options with a single keystroke. Press [S] or [D] to switch the source or destination drive number between 1 and 2, [F] to choose a formatting option, and [W] to turn Write Verification on and off.

COPYMATE displays a "map" of the source (original) disk on the screen. Each of the 720 dots initially displayed represent one sector (128 bytes) of the disk. If a sector contains data, the dot is replaced by a larger dot; if the sector can't be read, a question mark replaces the dot. When the sector is empty, the original dot remains. A line at the bottom of the screen indicates (in hexadecimal) the number of the sector being read or written.

COPYMATE does not copy blank sectors. You can copy your source disk in one pass if it is less than half full. To produce an exact copy, however, the destination disk must be formatted first. Results are unpredictable when this is not done.

When COPYMATE encounters a disk-read error, it will retry the sector involved for up to 15 seconds before proceeding to the next one. If you know a sector is bad, move COPYMATE to the next sector by pressing [BREAK]. When reading a series of bad sectors, wait at least 15 seconds between presses of [BREAK] or you may miss a sector.

If you're not using the Translator disk, you can press [RESET] at any time to abort a copy and return to the initial menu of options. Press [SELECT] during a read operation to skip the rest of the disk and start writing what's been read to the destination disk. If you're copying a DOS disk, do not press [SELECT] until the disk VTOC and directory (sectors $168 to $170) have been read. Otherwise, you won't be able to access the files on the disk.

You can use the [OPTION] key to make multiple copies of a disk with a single disk drive. You can also do this with a two-drive setup, but only if the source disk is less than half full (one-pass copy). Since you'll be switching half-copied disks, and there are no special prompts, you must keep track of each step of the operation.

First, set up for a one-drive copy. Insert the source disk and press [START]. When "INSERT DESTINATION DISK" appears, insert the first destination disk and press [START]. When "INSERT SOURCE DISK" or "COPY COMPLETE" appears, press [OPTION] to indicate that the data that's been read is to be written again. Then insert the second destina-

continued on next page

tion disk, and press [START]. Repeat the last two steps for each additional copy, and then repeat the entire process until all copies have been completed.

CUSTOMIZING COPYMATE

Listing 2 is a BASIC program (CUSTOMIZER) that sets COPYMATE parameters to your specifications. Type in Listing 2, check it with TYPO, and SAVE a copy as a backup. RUN the program and put the COPYMATE boot disk in Drive 1. (Use your backup copy of COPYMATE, in case there's a typing error in the CUSTOMIZER program.) Press [RETURN] and answer each question. The range of responses for each parameter is shown in square brackets; the current setting appears under the cursor. To accept the current setting for any parameter, press [RETURN]. After the final question, the new options will be written to the boot disk. *Remember to remove the BASIC cartridge before you boot COPYMATE.*

When using CUSTOMIZER, you must specify the make of the drive to be used. With one exception, Atari-compatible drives write zeros to a disk during the formatting operation. The exception is the Percom drive, which writes a pattern of $1A (hex) to the disk. For COPYMATE to determine whether a sector is empty or not, it must know if the disk was formatted on a Percom drive. If this option isn't set correctly, COPYMATE will work, but it won't skip blank sectors.

Mike Palmer is a software systems analyst (he designs operating systems) for a flight simulator firm in Quebec, Canada. He has owned his Atari 800 for 18 months, and programs primarily in assembly language. Mike is trying to start an Atari Users' Group in his area.

Listing 1

```
0100 .OPT NO LIST
0110 .TAB 11,15,31
0120 .TITLE "COPYMATE 1.4  03/21/84"
0130 ;
0160 ;          COPYMATE 1.4
0180 ;         BY MIKE PALMER
0190 ;         ANTIC MAGAZINE
0250 ;
0260 ;    PAGE ZERO
0270 ;    ---------
0280 ;
0290 SRCDRV = $80     SOURCE DRIVE
0300 DSTDRV = $81     DESTINATION DRIVE
0310 NUMDRV = $82     NUMBER OF DRIVES ON SYSTEM
0320 FMTTYP = $84     FORMAT TYPE
0330 SECSIZ = $85     SECTOR SIZE (DENISTY)
0340 WRTMOD = $89     WRITE MODE $57=VERIFY
0350 BUFFER = $8A     BUFFER POINTER
0360 BUFSAV = $8C     BUFFER POINTER SAVE
0370 SECSAV = $8E     SECTOR POINTER SAVE
0380 VTOC =   $90     SCREEN VTOC POINTER
0390 VTOSAV = $92     SCREEN VTOC POINTER SAVE
0400 VTOCI = $94      SCREEN VTOC INIT POINTER
0410 FMTFLG = $96     FORMAT FLAG
0420 ONMSG = $A0      ' ON' MESSAGE
0430 OFFMSG = $A3     'OFF' MESSAGE
0440 ;
0450 ;    O S
0460 ;    ---
0470 ;
0480 TRAMSZ = $06     TEST FOR LEFT CART
0490 TSTDAT = $07     TEST FOR RIGHT CART
0500 DOSVEC = $0A     DISK START VECTOR LSB
0510 DOSINI = $0C     DISK INIT VECTOR LSB
0520 POKMSK = $10     POKEY INTERUPTS
0530 ATRACT = $4D     ATTRACT MODE TIMER
0540 LMARGN = $52     LEFT MARGIN
0550 RMARGN = $53     RIGHT MARGIN
0560 ROWCRS = $54     CURSOR ROW
0570 SAVMSC = $59     START OF SCREEN DISPLAY MSB
0580 BOTSCR = $02BF   WINDOW ON=4 OFF=24
0590 BACKGR = $02C6   GR.0 BACKGROUND
0600 BORDER = $02C8   GR.0 BORDER
0610 CRSINH = $02F0   GR.0 CURSOR INHIBIT 0=ON
0620 CH   =   $02FC   INTERNAL VALUE FOR LAST KEY HIT
0630 DRVBYT = $070A   ZERO IF BOOTING
0640 IRQEN = $D20E    INTERUPT REQUEST ENABLE
0650 CONSOL = $D01F   CONSOL SWITCHES
0660 SIOV =   $E459   SERIAL I/O SUBROUTINE VECTOR
0670 COLDSV = $E477   COLD START VECTOR
0680 WARMSV = $E474   WARM START VECTOR
0690 PUTLIN = $F385   LINE PRINT SUBROUTINE
0700       .PAGE
0710 ;       SERIAL I/O
0720 ;       ----------
0730 ;
0740 DBUSID = $0300   SERIAL BUS ID
0750 DUNIT = $0301    DRIVE NUMBER
0760 DCOMND = $0302   COMMAND
0770 DSTATS = $0303   STATUS / DATA DIRECTION
0780 DBUFLO = $0304   BUFFER ADDRESS LSB
0790 DBUFHI = $0305   BUFFER ADDRESS MSB
0800 DTIMLO = $0306   TIMEOUT (SECONDS)
0810 DCNTLO = $0308   TRANSFER COUNT LSB
0820 DCNTHI = $0309   TRANSFER COUNT MSB
0830 DSECLO = $030A   SECTOR NUMBER LSB
0840 DSECHI = $030B   SECTOR NUMBER MSB
0850 ;
0860 ;        I/O COMMANDS
0870 ;        ------------
0880 ;
0890 FMTDSK = $21     FORMAT DISK
0900 PUTSEC = $50     PUT SECTOR (NO VERIFY)
0910 GETSEC = $52     GET SECTOR
0920 PUTVER = $57     PUT SECTOR (WITH VERIFY)
0930 PUTDEL = $59     PUT SECTOR (DELETED)
0940 PUTCRC = $5A     PUT SECTOR (CRC ERROR)
0950 GETDAT = $40     DATA DIRECTION IN
0960 PUTDAT = $80     DATA DIRECTION OUT
0970 ;
0980 ;        MISCELLANEOUS
0990 ;        -------------
1000 ;
1010 OFF =    $00     FLAG OFF
1020 ON  =    $01     FLAG ON
1030 TIMOUT = $07     I/O TIMEOUT (SECONDS)
1040 TIMFMT = $A0     FORMAT TIMEOUT (SECONDS)
1050 BUFBOT = $0350   BUFFER BOTTOM
1060 DISKID = $31     DISK DEVICE ID
1070 LSTSEC = $02D0   LAST SECTOR TO COPY
1080 SCVTOC = $90     SCREEN VTOC OFFSET ADDRESS
1090 SCNSEC = $BFA1   SCREEN W/R SEC # ADDR (48K)
1100 BRKINH = $40     INHIBIT BREAK KEY CODE
1110 BRKENA = $C0     ENABLE BREAK KEY CODE
1120 OPTNKY = $03     OPTION KEY CODE
1130 SELKEY = $05     SELECT KEY PRESSED
1140 STRTKY = $06     START KEY CODE
1150 RTNKEY = $0C     RETURN KEY CODE
1160 DKEY =   $3A     D KEY KEY CODE
1170 FKEY =   $38     F KEY KEY CODE
1180 SKEY =   $3E     S KEY KEY CODE
1190 VKEY =   $10     V KEY KEY CODE
1200 WKEY =   $2E     W KEY KEY CODE
1210 EMPTY = $0E      EMPTY SECTOR SCREEN CODE
1220 DATA =   $54     DATA SECTOR SCREEN CODE
1230 BAD =    $1F     BAD SECTOR SCREEN CODE
1240 POINT = $4E      VTOC POINTER SCREEN CODE
1250       .PAGE
1260 ORIGN1 = $3400   INITIALIZATION CODE ORIGIN
1270 ;
1280      *=  ORIGN1
1290 ;
1300 ;        BOOT HEADER (6 BYTES)
1310 ;        ---------------------
1320 ;
1330      .BYTE $00   BOOT FLAG
1340      .BYTE $0E   # SECTORS
1350      .WORD ORIGN1 LOAD ADDRESS
1360      .WORD BOONIT BOOT INIT
1370 ;
1380 ;        BOOT CONTINUATION
1390 ;        -----------------
1400 ;
1410      CLC         SIGNAL BOOT OK
1420      RTS
1430 ;
1440 ;
```

```
1450 ;        *************************
1460 ;        * USER DEFINITION TABLE *
1470 ;        *************************
1480 ;
1490 DEFSRC .BYTE $01 SOURCE DRIVE #
1500 DEFDST .BYTE $02 DESTINATION DRIV
E #
1510 DEFFMT .BYTE $00 FORMATTING $00=O
FF $01=ON
1520 DEFVFY .BYTE $50 WRITE VERIFY $50
=OFF $57=ON
1530 NDRIVE .BYTE $02 NUMBER OF DRIVES
 ON SYSTEM
1540 FMTCHR .BYTE $00 ATARI=$00 PERCOM
=$1A
1550 ;
1560 DENSIT .WORD $80 CURRENTLY SINGLE
 DENSITY ONLY
1570 ;
1580 ;
1590 ;        BOOT INITIALIZATION
1600 ;        ===================
1610 ;
1620 BOONIT LDA TRAMSZ ANY CARTRIDGES
1630       ORA TSTDAT  PLUGGED IN ?
1640       BEQ BOOMAK
1650       LDX #CRTMSG&255 TELL USER TO
1660       LDY #CRTMSG/256 REMOVE IT
1670       JSR PRINT
1680 BOODIE JMP BOODIE HANG AROUND
1690 ;
1700 BOOMAK LDA CONSOL MAKE BOOT DISK?
1710       CMP #OPTNKY
1720       BNE BOOSET  NO
1730       JMP MAKER   YES
1740 ;
1750 BOOSET LDA #RUNNIT&255 SET UP RES
ET
1760       STA DOSVEC  KEY VECTORS
1770       STA DOSINI
1780       LDA #RUNNIT/256
1790       STA DOSVEC+1
1800       STA DOSINI+1
1810 ;
1820       LDA #0      INIT POINTER
1830       STA SECSAV  SAVERS
1840       STA SECSAV+1
1850       STA BUFSAV
1860       STA BUFSAV+1
1870 ;
1880 ;     SET-UP USING USER DEFINITION
TABLE
1890 ;
1900       LDA DEFSRC  SOURCE DRIVE
1910       STA SRCDRV
1920       CLC
1930       ADC #$30
1940       STA OPTS
1950       LDA DEFDST  DESTINATION DRIVE
1960       STA DSTDRV
1970       CLC
1980       ADC #$30
1990       STA OPTD
2000       LDA NDRIVE  TOTAL # DRIVES
2010       STA NUMDRV
2020       INC NUMDRV
2030       LDA FMTCHR  FORMAT CHARACTER
2040       STA FMTTYP
2050       LDA DENSIT  DISK DENSITY
2060       STA SECSIZ
2070       LDA DENSIT+1
2080       STA SECSIZ+1
2090 ;
2100       LDA #'      SET UP ' ON'
2110       STA ONMSG   AND 'OFF' MSGS
2120       LDA #'O
2130       STA ONMSG+1
2140       STA OFFMSG
2150       LDA #'N
2160       STA ONMSG+2
2170       LDA #'F
2180       STA OFFMSG+1
2190       STA OFFMSG+2
2200 ;
2210       LDY #OPTV-OPTMS3 WRITE
2220       LDA #PUTVER VERIFICATION
2230       CMP DEFVFY
2240       BNE BOOVOF
2250 BOOVON STA WRTMOD
2260       LDX #0
2270       BEQ BOOVFY  (JMP)
2280 BOOVOF LDA #PUTSEC
2290       STA WRTMOD
2300       LDX #3
2310 BOOVFY JSR BOOUPD
2320 ;
2330       LDY #OPTF-OPTMS3 FORMAT
2340       LDA #ON      DESTINATION
2350       CMP DEFFMT
2360       BNE BOOFOF
2370 BOOFON STA FMTFLG
2380       LDX #0
2390       BEQ BOOFMT   (JMP)
2400 BOOFOF LDA #0
2410       STA FMTFLG
2420       LDX #3
2430 BOOFMT JSR BOOUPD
2440 ;
2450       LDA SAVMSC   FIX SCREEN WRITE
2460       CLC          ADDRESSES FOR
2470       ADC #3       MEMORY SIZES
2480       STA SECFIX+2 OTHER THAN 48K
2490       STA SECFIX+5
2500       STA SECFIX+$0E
2510 ;
2520 BOOEPL LDA DRVBYT IS THIS A BOOT
?
2530       BEQ BOODON
2540       JMP WARMSV   NO - DO SYS RESET
2550 BOODON RTS         YES - INIT DONE
2560 ;
2570 BOOUPD LDA ONMSG,X UPDATE ON/OFF
2580       STA OPTMS3,Y MESSAGES
2590       LDA ONMSG+1,X
2600       STA OPTMS3+1,Y
2610       LDA ONMSG+2,X
2620       STA OPTMS3+2,Y
2630 BOOEND RTS
2640 ;
2650 CRTMSG .BYTE "↖↓↓↓       PLEASE REMO
VE ALL CARTRIDGES"
2660       .BYTE "↓                  AND T
HEN RE-BOOT↘",$9B
2670       .PAGE
2680 ORIGN2 *= $3550 MAIN CODE ORIGIN
2690 ;
2700 ;
2710 ;        RUN INITIALIZATION
2720 ;        ==================
2730 ;
2740 RUNNIT LDA #9      SET LEFT &
2750       STA LMARGN   RIGHT MARGIN
2760       LDA #31      TO ASSIST IN
2770       STA RMARGN   MSG OUTPUT
2780 ;
2790       LDA #$94     STANDARD
2800       STA BORDER   SCREEN COLOR
2810 ;
2820       LDA #0
2830       LDX #$0A     ZERO OUT
2840 RUNZRO STA DUNIT,X DISK DCB
2850       DEX
2860       BNE RUNZRO
2870 ;
2880 ;
2890       LDA #DISKID  UNIT ID = DISK
2900       STA DBUSID
2910       INC DSECLO   FIRST SEC = 1
2920 ;
2930       LDX #HDRMSG&255 O/P COPYMATE
2940       LDY #HDRMSG/256 HEADER MSG
2950       JSR PRINT
2960 ;
2970 ;        OPTION CHANGER
2980 ;        --------------
2990 ;
3000 OPTCHG LDA #7      RESET TO OPTION
3010       STA ROWCRS   DISPLAY AREA
3020 ;
3030       LDX #OPTMS1&255 DISPLAY
3040       LDY #OPTMS1/256 CURRENT
3050       JSR PRINT    OPTIONS
3060       LDX #OPTMS2&255
3070       LDY #OPTMS2/256
3080       JSR PRINT
3090       LDX #OPTMS3&255
3100       LDY #OPTMS3/256
3110       JSR PRINT
3120       LDX #OPTMS4&255
3130       LDY #OPTMS4/256
3140       JSR PRINT
3150 ;
3160       LDA #GETDAT DATA DIRECTION
3170       STA DSTATS
3180       JSR INSER2 ;"INSERT" MSG
3190       LDA #BRKINH INHIBIT BREAK KEY
3200       STA IRQEN
3210       STA POKMSK
3220 ;
3230 OPTLUP LDA CONSOL START PRESSED
3240       CMP #STRTKY YET ?
3250       BNE OPTKEY
3260       BEQ VTONIT  GO!
3270 ;
3280 OPTKEY LDA CH     CHANGE OPTIONS?
3290       CMP #SKEY   SOURCE DISK
3300       BEQ OPTSRC
3310       CMP #DKEY   DESTINATION DISK
3320       BEQ OPTDST
3330       CMP #FKEY   FORMAT
3340       BEQ OPTFMT
3350       CMP #VKEY   VERIFY
3360       BEQ OPTVFY
3370       CMP #WKEY   VERIFY
3380       BNE OPTLUP
3390 ;
3400 ;        CHANGE VERIFY OPTION
3410 ;
3420 OPTVFY LDY #OPTV-OPTMS3 MSG OFFSE
T
3430       LDA #PUTVER
3440       CMP WRTMOD  VERIFY ON?
3450       BEQ OPTVOF
3460 OPTVON STA WRTMOD TURN VFY ON
3470       LDX #0      SELECT ON MSG
3480       BEQ OPTUPD  (JMP)
3490 OPTVOF LDA #PUTSEC
3500       STA WRTMOD  TURN VFY OFF
3510       LDX #3      SELECT OFF MSG
3520       BNE OPTUPD  (JMP)
3530 ;
3540 ;        CHANGE FORMAT OPTION
3550 ;
3560 OPTFMT LDY #OPTF-OPTMS3 MSG OFFSE
T
3570       LDA #ON
3580       CMP FMTFLG  FORMAT ON?
3590       BEQ OPTFOF
3600 OPTFON STA FMTFLG TURN FMT ON
3610       LDX #0      ON MSG
3620       BEQ OPTUPD  (JMP)
3630 OPTFOF DEC FMTFLG TURN FMT OFF
3640       LDX #3      OFF MSG
3650 ;
3660 ;        CHANGE OPTION MESSAGES
3670 ;
3680 OPTUPD LDA ONMSG,X X=FROM OFFSET
3690       STA OPTMS3,Y Y=TO OFFSET
3700       LDA ONMSG+1,X
3710       STA OPTMS3+1,Y
3720       LDA ONMSG+2,X
3730       STA OPTMS3+2,Y
3740       BNE OPTCLK  (JMP)
3750 ;
3760 ;        CHANGE DRIVE OPTIONS
3770 ;
3780 OPTSRC LDX #0     SET UP TO
3790       LDY #0      CHANGE SRC
3800       BEQ OPTDRV  (JMP)
3810 OPTDST LDX #1     SET UP TO
3820       LDY #OPTD-OPTS CHANGE DEST
3830 OPTDRV INC SRCDRV,X
3840       LDA SRCDRV,X
3850       CMP NUMDRV
3860       BCC OPTLT
3870       LDA #1      RESET TO 1
3880       STA SRCDRV,X
3890       CLC
3900 OPTLT ADC #$30
3910       STA OPTS,Y  UPDATE MSG
```

continued on next page

```
3920 ;
3930 OPTCLK LDA #$FF CLEAR KEY
3940      STA CH         PRESS
3950 OPTEND JMP OPTCHG
3960 ;
3970 ;      SCREEN VTOC INITIALIZATION
3980 ;      --------------------------
3990 ;
4000 VTONIT LDA #SCVTOC VTOC SCRN OFFS
ET
4010      STA VTOC
4020      STA VTOCI
4030      LDA SAVMSC
4040      STA VTOC+1
4050      STA VTOCI+1
4060      LDX #3          LOOP 3 TIMES
4070      LDA #EMPTY
4080 VTOLP1 LDY #0       INIT $100 BYTES
4090 VTOLP2 STA (VTOCI),Y EACH PASS
4100      INY
4110      BNE VTOLP2
4120      INC VTOCI+1
4130      DEX
4140      BNE VTOLP1
4150 ;
4160 ;      COPY DISK
4170 ;      =========
4180 ;
4190 ;      GET BLOCK OF SECTORS
4200 ;      --------------------
4210 ;
4220 GET LDA SRCDRV
4230      STA DUNIT
4240      LDA #GETSEC
4250      STA DCOMND
4260      LDA DSECLO     NO MSG ON
4270      CMP #1         FIRST PASS
4280      BEQ GET.0
4290      JSR INSER1 ;"INSERT" MSG
4300      JSR WAIT1      WAIT FOR GO!
4310 ;
4320 GET.0 LDA DSECLO SAVE START
4330      STA SECSAV     SEC # AND VTOC
4340      LDA DSECHI     POINTER FOR
4350      STA SECSAV+1 WRITE BACK OUT
4360      LDA VTOC       TO DISK LATER
4370      STA VTOSAV
4380      LDA VTOC+1
4390      STA VTOSAV+1
4400 ;
4410      LDX #REDMSG&255;"READING" MSG
4420      LDY #REDMSG/256
4430      JSR PASNIT     PASS INIT
4440 ;
4450 GET.1 LDA CONSOL SELECT KEY
4460      CMP #SELKEY PRESSED?
4470      BEQ PUT        SKIP READING
4480 ;
4490      LDA #GETDAT    SET DATA DIR
4500      JSR SECTIO     GET A SECTOR
4510      BPL GET.2      NO ERROR
4520 ;
4530      TYA            RE-TRY UNTIL
4540      AND #$0F       ERR $80 (BRK)
4550      BNE GET.1      OR $90 (DONE)
4560      LDA #BAD       SHOW BAD
4570      BNE GET.5      (JMP)
4580 ;
4590 GET.2 LDY DCNTLO
4600      DEY
4610 GET.3 LDA (BUFFER),Y ANY DATA IN
4620      CMP FMTTYP     THIS SECTOR
4630      BNE GET.4      YES
4640      DEY
4650      BPL GET.3      KEEP LOOKING
4660      LDA #EMPTY     NO
4670      BNE GET.5      (JMP)
4680 GET.4 JSR INCBUF INC BUFFER POINT
ERS
4690      LDA #DATA
4700 ;
4710 GET.5 LDY #0
4720      STA (VTOC),Y STORE SECTOR STA
TUS
4730      JSR INCSEC    INC OTHER POINTER
S
4740 ;
4750      BCC GET.1     GET NEXT SECTOR
4760 ;
4770 ;      PUT BLOCK OF SECTORS
4780 ;      --------------------
4790 ;
4800 PUT LDA DSTDRV   DESTINATION DRV
4810      STA DUNIT
4820      LDA #PUTDAT SET DATA DIR
4830      STA DSTATS
4840      JSR INSER1 ;"INSERT" MSG
4850      JSR WAIT1    WAIT FOR GO!
4860 ;
4870 PUT.1 JSR FMTDST
4880 ;
4890      LDA SECSAV   RESET
4900      STA DSECLO   SECTOR & VTOC
4910      LDA SECSAV+1 POINTERS FOR
4920      STA DSECHI   WRITING SECTORS
4930      LDA VTOSAV
4940      STA VTOC
4950      LDA VTOSAV+1
4960      STA VTOC+1
4970      LDX #WRTMSG&255;"WRITING"
4980      LDY #WRTMSG/256
4990      JSR PASNIT
5000      LDA WRTMOD   WITH OR WITHOUT V
FY
5010      STA DCOMND
5020 ;
5030 ;
5040 PUT.2 LDY #0      DATA IN THIS SEC?
5050      LDA (VTOC),Y
5060      AND #$E0
5070      BEQ PUT.4    NO - NOTHING TO D
O
5080 ;
5090      LDA #PUTDAT SET DATA DIR
5100      JSR SECTIO   PUT A SECTOR
5110      BPL PUT.3
5120 ;
5130      LDX #WERMSG&255;"WRITE ERROR"
5140      LDY #WERMSG/256
5150      JSR CHKDST ;"CHECK DEST"
5160      LDX SECSAV   RE-TRY ON
5170      CPX #1       1ST PASS ONLY
5180      BNE PUT.2A
5190      LDX SECSAV+1
5200      BEQ PUT.1
5210 ;
5220 PUT.2A JMP (DOSVEC) ABORT COPY
5230 ;
5240 PUT.3 LDA #DATA
5250      LDY #0
5260      STA (VTOC),Y
5270 ;
5280      JSR INCBUF   INCREMENT
5290 PUT.4 JSR INCSEC POINTERS
5300 ;
5310      BCC PUT.2    PUT NEXT SECTOR
5320 ;
5330      BEQ DONE     COPY COMPLETE?
5340      JMP GET      NO
5350 ;
5360 ;      COPY DONE
5370 ;      ---------
5380 ;
5390 DONE LDX #DNEMSG&255;"DONE"
5400      LDY #DNEMSG/256
5410      JSR PRINTW
5420      JSR WAIT
5430      JMP (DOSVEC) NEXT COPY
5440 ;
5450 ;      SUBROUTINES
5460 ;      ===========
5470 ;
5480 ;      DISK INSERT MESSAGES
5490 ;      --------------------
5500 ;
5510 INSER1 LDA SRCDRV 2 DRIVES ?
5520      CMP DSTDRV
5530      BNE INSEND   NO MSG
5540 INSER2 LDA SRCDRV 2 DRIVES ?
5550      CMP DSTDRV
5560      BNE INSBOT
5570 INSROW LDA DSTATS READ OR WRITE?
5580      BPL INSSRC   WRT=+VE READ=-VE
5590 INSDST LDX #DSTMSG&255;"INSERT
5600      LDY #DSTMSG/256 DESTINATION"
5610      BNE INSPRT   (JMP)
5620 INSSRC LDX #SRCMSG&255;"INSERT
5630      LDY #SRCMSG/256 SOURCE DISK"
5640      BNE INSPRT   (JMP)
5650 INSBOT LDX #BOTMSG&255;"INSERT
5660      LDY #BOTMSG/256 BOTH DISKS"
5670 INSPRT JSR PRINTW
5680 INSTRT LDX #TPSMSG&255;"THEN PRES
S
5690      LDY #TPSMSG/256 START"
5700      JSR PRINTW
5710 INSEND RTS
5720 ;
5730 ;      PASS INITIALIZATION
5740 ;      -------------------
5750 ;
5760 PASNIT JSR PRINTW O/P MSG
5770 ;
5780      LDA #BUFBOT&255 INIT TO START
5790      STA DBUFLO   OF BUFFER
5800      STA BUFFER
5810      LDA #BUFBOT/256
5820      STA DBUFHI
5830      STA BUFFER+1
5840 ;
5850 PASEPL STA ATRACT ATTRACT MODE OF
F
5860      LDA #BRKENA ENABLE BREAK KEY
5870      STA IRQEN
5880      STA POKMSK
5890 PASEND RTS
5900 ;
5910 ;      INCREMENT POINTERS
5920 ;      ------------------
5930 ;
5940 INCBUF LDA BUFFER INC BUFFER
5950      CLC          POINTERS BY
5960      ADC SECSIZ   SECTOR SIZE
5970      STA DBUFLO
5980      STA BUFFER
5990      LDA BUFFER+1
6000      ADC SECSIZ+1
6010      STA DBUFHI
6020      STA BUFFER+1
6030 ;
6040 ;      IF WE HAVE REACHED THE COD
E
6050 ;      SECTION OF MEMORY - SKIP I
T
6060 ;
6070      CMP #ORIGN2/256
6080      BNE INCRTS
6090      LDA #ORIGN2/256+5
6100      STA BUFFER+1
6110      STA DBUFHI
6120      LDA #0
6130      STA BUFFER
6140      STA DBUFLO
6150 INCRTS RTS
6160 ;
6170 INCSEC LDX DSECLO LAST
6180      CPX #LSTSEC&255 SECTOR ?
6190      BNE INC.2
6200      LDX DSECHI
6210      CPX #LSTSEC/256
6220      BEQ INCEND
6230 ;
6240 INC.2 INC DSECLO INCREMENT SECTOR
6250      BNE INC.3    AND VTOC POINTERS
6260      INC DSECHI
6270 INC.3 INC VTOC
6280      BNE INC.4
6290      INC VTOC+1
6300 ;
6310 INC.4 LDA BUFFER+1
6320      CMP SAVMSC   BUFFER FULL?
6330      BCC INCEND   NO
6340      LDA #1       SHOW BUFFER FULL
6350 INCEND RTS
6360 ;
6370 ;      WAIT FOR START KEY PRESS
6380 ;      ------------------------
6390 ;
6400 WAIT1 LDA SRCDRV 2 DRIVES ?
6410      CMP DSTDRV
6420      BNE WAIEND
6430 ;
```

```
6440 WAIT LDA #BRKINH INHIBIT BREAK KEY
6450      STA IRQEN    DURING THE WAIT
6460      STA POKMSK
6470 ;
6480      LDX CONSOL
6490      CPX #STRTKY  START KEY?
6500      BEQ WAIEND
6510      CPX #OPTNKY OPTION KEY?
6520      BNE WAIT
6530 ;
6540      PLA          LOSE RETURN ADDR
6550      PLA          OPTION =
6560      JMP PUT      REPEAT COPY
6570 WAIEND RTS
6580 ;
6590 ;       "CHECK DESTINATION"
6600 ;       -------------------
6610 ;
6620 CHKDST JSR PRINTW O/P ERROR MSG
6630      LDX #CHKMSG&255;"CHECK DEST"
6640      LDY #CHKMSG/256
6650      JSR PRINTW
6660      JSR INSTRT ;"START"
6670      JSR WAIT     WAIT FOR GO
6680 CHKEND RTS
6690 ;
6700 ;       SECTOR I/O
6710 ;       ----------
6720 ;
6730 SECTIO STA DSTATS DATA DIRECTION
6740      LDA #TIMOUT
6750      STA DTIMLO
6760      LDA SECSIZ
6770      STA DCNTLO
6780 ;
6790      LDA #POINT   POINT TO CURRENT
6800      LDY #0       SECTOR IN THE
6810      STA (VTOC),Y SCREEN VTOC
6820 ;
6830      LDA DSECLO   WRITE SECTOR
6840      JSR HEXSCR   NUMBER TO THE
6850 SECFIX STX SCNSEC+3 SCREEN
6860      STY SCNSEC+2
6870      LDA DSECHI
6880      JSR HEXSCR
6890      STA SCNSEC+1
6900 ;
6910      JSR SIOV     DO THE I/O
6920 SHOEND RTS
6930 ;
6940 ;       CONVERT HEX TO SCREEN CODE
6950 ;       --------------------------
6960 ;       A=HEX -> X=LSB Y=MSB
6970 ;
6980 HEXSCR PHA        SAVE #
6990      LSR A        GET MSB
7000      LSR A
7010      LSR A
7020      LSR A
7030      JSR HEX1     CONV SCN CODE
7040      TAY          RETURN IN Y
7050      PLA
7060      AND #$0F     GET LSB
7070      JSR HEX1     CONV SCN CODE
7080      TAX          RETURN IN X
7090      RTS
7100 ;
7110 HEX1 CMP #$0A     BETWEEN 0&9?
7120      BCC HEX2
7130      CLC          NO A-F
7140      ADC #$07     'A'=$21
7150 HEX2 ADC #$10     '0'=$10
7160 HEXEND RTS
7170 ;
7180 ;       SCREEN PRINT
7190 ;       ------------
7200 ;
7210 PRINTW LDA #4     WINDOW ON
7220      STA BOTSCR
7230 PRINT STY CRSINH INHIBIT CURSOR
7240      JSR PUTLIN
7250      LDA #24
7260      STA BOTSCR   WINDOW OFF
7270 PRIEND RTS
7280 ;
7290 ;       FORMAT DESTINATION
7300 ;       ------------------
7310 ;
7320 FMTDST LDX FMTFLG FORMAT ?
7330      BEQ FOREND
7340      LDX SECSAV   FORMAT ON FIRST
7350      CPX #1       PASS ONLY
7360      BNE FOREND
7370      LDX SECSAV+1
7380      BNE FOREND
7390 ;
7400      LDA #FMTDSK
7410      STA DCOMND
7420      LDA #TIMFMT
7430      STA DTIMLO
7440      LDA #GETDAT
7450      STA DSTATS
7460      LDA #$C0     DUMP BAD SECTORS
7470      STA DBUFHI
7480      LDX #FMTMSG&255;"FORMATTING"
7490      LDY #FMTMSG/256
7500      JSR PRINTW
7510 ;
7520      JSR SIOV     GO DO IT
7530      BPL FOREND   OK
7540 ;
7550      LDX #FERMSG&255;"FORMAT ERR"
7560      LDY #FERMSG/256
7570      JSR CHKDST ;"CHECK DEST"
7580      BEQ FMTDST   JMP RE-TRY
7590 ;
7600 FOREND RTS
7610 ;
7620 ;       MESSAGE BASE
7630 ;       ============
7640 ;
7650 HDRMSG .BYTE "↖      COPYMATE 1.4↓"
7660      .BYTE "      BY MIKE PALMER",$9B
7670 OPTMS1 .BYTE "↓SOURCE DRIVE .... #"
7680 OPTS .BYTE "?",$9B
7690 OPTMS2 .BYTE "↓DESTINATION DRIVE #"
7700 OPTD .BYTE "?",$9B
7710 OPTMS3 .BYTE "↓FORMAT DESTINATION "
7720 OPTF .BYTE "???",$9B
7730 OPTMS4 .BYTE "↓WRITE VERIFICATION "
7740 OPTV .BYTE "???",$9B
7750 DNEMSG .BYTE "↖↓     COPY COMPLETED   ⇲"
7760      .BYTE "↓      PRESS  START ↑",$9B
7770 FMTMSG .BYTE "↖↓       FORMATTING",$9B
7780 FERMSG .BYTE "↖↓     FORMATTING ERROR",$9B
7790 WERMSG .BYTE "↖↓        WRITE ERROR",$9B
7800 CHKMSG .BYTE "⇲CHECK DESTINATION DISK↑",$9B
7810 REDMSG .BYTE "↖↓  READING SECTOR",$9B
7820 WRTMSG .BYTE "↖↓  WRITING SECTOR",$9B
7830 DSTMSG .BYTE "↖↓INSERT DESTINATION DISK↑",$9B
7840 SRCMSG .BYTE "↖↓  INSERT SOURCE DISK",$9B
7850 BOTMSG .BYTE "↖↓  INSERT BOTH DISKS",$9B
7860 TPSMSG .BYTE "↓ THEN PRESS START ↑",$9B
7870      .PAGE
7880 ;
7890 ;       BOOT DISK MAKER
7900 ;       ===============
7910 ;
7920      *=  $3A00
7930 ;
7940 MAKER LDA #$34    RED WARNING
7950      STA BACKGR   SCREEN COLOR
7960      STA BORDER
7970      LDA #2       LEFT MARGIN=2
7980      STA LMARGN
7990 ;
8000      LDX #MAKMSG&255;"MAKER"
8010      LDY #MAKMSG/256 MESSAGE
8020      JSR PRINT
8030 ;
8040 MAKEWT LDA CH     WAIT FOR
8050      CMP #RTNKEY  RETURN KEY?
8060      BNE MAKEWT
8070 ;
8080      LDA #0
8090      LDX #$0A     CLEAR OUT
8100 MAKEZR STA DUNIT,X DISK DCB
8110      DEX
8120      BNE MAKEZR
8130 ;
8140      LDA #DISKID SET UP THE DCB
8150      STA DBUSID
8160      LDA #1
8170      STA DUNIT
8180      INC DSECLO
8190      LDA #ORIGN1&255
8200      STA DBUFLO
8210      LDA #ORIGN1/256
8220      STA DBUFHI
8230      LDA #$80
8240      STA DCNTLO
8250      LDA #PUTVER
8260      STA DCOMND
8270      LDA #TIMOUT
8280      STA DTIMLO
8290 ;
8300 MAKEIO LDA #PUTDAT WRITE COPYMATE
8310      STA DSTATS
8320      JSR SIOV     PUT SECTOR
8330      BMI MAKEIO   TRY AGAIN ON ERROR
8340      LDA DBUFLO
8350      CLC
8360      ADC #$80
8370      STA DBUFLO
8380      LDA DBUFHI
8390      ADC #$00
8400      STA DBUFHI
8410 ;
8420      CMP #END/256+1 ALL DONE?
8430      BEQ MAKEDN
8440      INC DSECLO
8450      JMP MAKEIO
8460 ;
8470 MAKEDN JMP COLDSV COLD START
8480 ;
8490 MAKMSG .BYTE "↖  COPYMATE 1.4 - BOOT DISK MAKER       ↖↖↖↓↓↓↓↓↓"
8500      .BYTE " INSERT A NEWLY FORMATTED DISK INTO "
8510      .BYTE "↓     DRIVE ONE -- THEN PRESS  RETURN "
8520 END .BYTE $9B
8530      *=  $02E0    LOAD & GO ADDRESS
8540      .WORD BOONIT
8550      .OPT NO LIST
```

Listing 2

```
10 REM COPYMATE 1.4 CUSTOMIZER
20 REM BY MIKE PALMER
30 REM ANTIC MAGAZINE
40 DIM A$(128),B$(1),FMT$(1),VFY$(1),DRV$(1)
```

continued on next page

```
50 OPEN #1,4,0,"E:":POKE 710,148:POKE
712,148:POKE 82,0:POKE 752,1
60 A$="▼":A$(128)="▼":A$(2)=A$
70 DSKWRT=ADR("hLSd"):REM SECTOR I/O R
OUTINE
80 PRINT "↖                COPYMATE 1.4 CUSTOM
ISER "
90 PRINT "↓↓↓↓↓↓↓↓          INSERT COPYMATE
1.4 BOOT DISK"
100 PRINT "↓  INTO DRIVE #1 - THEN PRE
SS  RETURN ↖←";
110 INPUT #1,B$
120 REM READ 1ST SECTOR OFF THE DISK
130 BUFFAD=ADR(A$)
140 SEC=1:DCOM=82:DDIR=64
150 GOSUB 790:REM SET UP DISK DCB
160 X=USR(DSKWRT):REM READ SECTOR
170 IF PEEK(771)=1 THEN 210
180 ? "↖↓↓↓          ERROR IN READING FROM D
RIVE ONE"
190 ? "↓         CHECK IT OUT -- THEN RE-
RUN↖↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
200 END
210 REM ASK FOR NEW PARAMETERS
220 ? "↖ENTER REQUIRED DEFAULTS - CURR
ENT VALUES"
230 ? "↑     ARE SHOWN UNDER THE CURSOR
AND MAY"
240 ? " BE ENTERED SIMPLY BY PRESSING
 RETURN ↓↓"
250 POKE 752,0
260 TRAP 260
270 ? "↓ NUMBER OF DRIVES ON SYSTEM ?
[1-8] :";ASC(A$(13));"←";
280 INPUT #1,NDRIVE
290 IF NDRIVE<1 OR NDRIVE>8 THEN 260
300 IF NDRIVE=1 THEN SOURCE=1:DESTIN=1
:GOTO 390
310 TRAP 310
320 ? "↓ SOURCE DISK DRIVE ........ ?
[1-";NDRIVE;"] :";ASC(A$(9));"←";
330 INPUT #1,SOURCE
340 IF SOURCE>NDRIVE OR SOURCE<1 THEN
310
350 TRAP 350
360 ? "↓ DESTINATION DISK DRIVE ... ?
[1-";NDRIVE;"] :";ASC(A$(10));"←";
370 INPUT #1,DESTIN
380 IF DESTIN>NDRIVE OR DESTIN<1 THEN
350
390 TRAP 390
400 IF ASC(A$(11))=0 THEN FMT$="N"
410 IF ASC(A$(11))=1 THEN FMT$="Y"
420 ? "↓ FORMAT DESTINATION DISK .. ?
[Y/N] :";FMT$;"←";
430 INPUT #1,FMT$
440 IF FMT$<>"N" AND FMT$<>"Y" THEN 39
0
450 TRAP 450
460 IF ASC(A$(12))=80 THEN VFY$="N"
470 IF ASC(A$(12))=87 THEN VFY$="Y"
480 ? "↓ WRITE WITH VERIFICATION .. ?
[Y/N] :";VFY$;"←";
490 INPUT #1,VFY$
500 IF VFY$<>"N" AND VFY$<>"Y" THEN 45
0
510 TRAP 510
520 IF ASC(A$(14))=0 THEN DRV$="A"
530 IF ASC(A$(14))=26 THEN DRV$="P"
540 ? "↓ ATARI OR PERCOM DRIVES ... ?
[A/P] :";DRV$;"←";
550 INPUT #1,DRV$
560 IF DRV$<>"A" AND DRV$<>"P" THEN 51
0
570 REM SET UP NEW VALUES
580 A$(9)=CHR$(SOURCE)
590 A$(10)=CHR$(DESTIN)
600 A$(13)=CHR$(NDRIVE)
610 IF FMT$="N" THEN A$(11)=CHR$(0)
620 IF FMT$="Y" THEN A$(11)=CHR$(1)
630 IF VFY$="N" THEN A$(12)=CHR$(80)
640 IF VFY$="Y" THEN A$(12)=CHR$(87)
650 IF DRV$="A" THEN A$(14)=CHR$(0)
660 IF DRV$="P" THEN A$(14)=CHR$(26)
670 REM WRITE 1ST SECTOR BACK TO DISK
680 SEC=1:DCOM=87:DDIR=128
690 GOSUB 790:REM SET UP DISK DCB
700 X=USR(DSKWRT):REM WRITE SECTOR
710 POKE 752,1
720 IF PEEK(771)=1 THEN 760
730 ? "↖↓↓↓        ERROR IN WRITING TO DR
IVE ONE"
740 ? "↓      CHECK IT OUT -- THEN PRESS 
RETURN "
750 INPUT #1,B$:GOTO 690
760 ? "↓↓↓    COPYMATE 1.4 CUSTOMIZATION
 COMPLETE"
770 ? "↓ REMOVE BASIC CART BEFORE RE-
BOOTING":? :?
780 END
790 REM DISK DCB SET UP SUBROUTINE
800 POKE 768,49:REM DEVICE = DISK
810 POKE 769,1:REM UNIT = 1
820 POKE 770,DCOM:REM COMMAND
830 POKE 771,DDIR:REM DIRECTION
840 AH=INT(BUFFAD/256)
850 AL=BUFFAD-AH*256
860 POKE 772,AL:REM BUFFER ADDRESS LO
870 POKE 773,AH:REM BUFFER ADDRESS HI
880 POKE 774,7:REM TIMEOUT IN SECS
890 POKE 776,128:REM TRANSFER COUNT LO
900 POKE 777,0:REM TRANSFER COUNT HI
```

```
910 POKE 778,SEC:REM SECTOR NUMBER LO
920 POKE 779,0:REM SECTOR NUMBER HI
930 RETURN
```

TYPO TABLE

Variable checksum = 465015

Line num range	Code	Length
10 — 120	SO	506
130 — 240	HT	420
250 — 360	QU	404
370 — 480	TI	356
490 — 600	MF	304
610 — 720	TH	395
730 — 840	TV	397
850 — 930	DT	290

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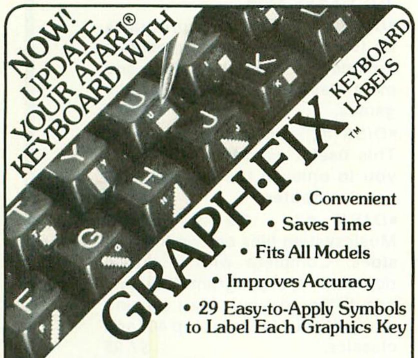
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SHOPPER'S GUIDE
continued from page 95

FADER—A CLASSY VIDEO SLIDE SHOW continued from page 98

```
10 REM MICRO FADER
20 REM BY JOSEPH GRANDE
30 REM ANTIC MAGAZINE
40 DIM H$(2),ARRAY$(96),HOLD$(1200),HE
X$(23),FILE$(20):HEX$="@ABCDEFGHI#####
##JKLMNO":CASS=0:Q=1
70 ? "PLEASE WAIT....":FOR D=1 TO 500
:NEXT D:POKE 559,0
130 RESTORE 2000:FOR LINE=2000 TO 2250
 STEP 10:GOSUB 140:NEXT LINE:GOTO 190
140 READ ARRAY$,LSUM:FOR HNUM=1 TO LEN
(ARRAY$) STEP 2:H$=ARRAY$(HNUM,HNUM+1)
150 D=0:FOR I=1 TO 2:D=D*16+ASC(HEX$(A
SC(H$(I))-47))-64:NEXT I
155 SUM=SUM+(ASC(H$(1,1))+ASC(H$(2,2))
):HOLD$(Q,Q)=CHR$(D):Q=Q+1:NEXT HNUM
160 CL=PEEK(183)+PEEK(184)*256:IF CL<>
LINE THEN POKE 559,34:? "LINE ";LINE;"
 IS MISSING.":END
170 IF LSUM<>SUM THEN POKE 559,34:? "
BAD DATA AT LINE #";LINE:END
180 RETURN
190 POKE 559,34:? "PRESS <RETURN> TO
 SAVE THE FILE.":INPUT H$
200 CLOSE #1:OPEN #1,8,0,"D:FADER.EXE"
:IOCB=848:POKE IOCB+2,11
210 ADDRESS=ADR(HOLD$):ADHI=INT(ADDRES
S/256):ADLO=ADDRESS-ADHI*256
220 BYTES=LEN(HOLD$):NUMHI=INT(BYTES/2
56):NUMLO=BYTES-NUMHI*256
230 POKE IOCB+4,ADLO:POKE IOCB+5,ADHI:
POKE IOCB+8,NUMLO:POKE IOCB+9,NUMHI
240 X=USR(ADR("hhhLVd"),16)
250 CLOSE #1:? "ALL DONE.":END
2000 DATA FFFFE002E1028421001E61228DCC
1E0ECC1E0ECC1E0ECC1E0ECC1E608DCC1E2003
1EAECC1EA90C9D42039D4203,5255
2010 DATA 4CB61E858068AA68A86885816885
83688582688DCC1E98488A48A000A9008D6722
B180998004C99BD0034C5B1E,10322
2020 DATA C93AD005A9018D6722C84C421EAD
6722C900F0034C841EA9448D8004A93A8D8104
A000A202B1809D8004C99BD0,15371
2030 DATA 034C841EE8C84C731E20031EAECC
1EA5829D4A03A5839D4B03A9809D4403A9049D
4503A9039D42034CB61E8DCA,20504
2040 DATA 1E68AA68A8688DCB1E98488A4860
2056E4AECC1EBD43038D662229800C900D00160
4C74E4008582A90748A58229,25578
2050 DATA 30491018690C48A582290F48A91E
48A9E94CED1E533A9B0020241E60858068AA68
A86885819848848AECC1EA9,30674
2060 DATA 009D4803A9019D4903A5809D4403
A5819D4503A9059D420320B61EA000B180C99B
D0034C2C1FC84C1F1FC8A900,35707
2070 DATA 9180608580 68AA68A86885816885
8498488A48A9FF8585A5840AB00546854C481F
AD0AD22585C584F002B0F5A0,40769
2080 DATA 00918060 8D6C22A9448D6E22A93A
8D6F22A203BD6E22C920D0034C811FE8E00BF0
034C6F1F8AC90B90034CAD1F,45901
2090 DATA AD78229D6F22AD79229D7022AD7A
229D7122A92E9D6E22A59B9D7222A5009D7322
4CCE1FAD7A228D7B22AD7922,51071
2100 DATA 8D7A22AD78228D7922A92E8D7822
A59B8D7C22A5008D7D22608D6D22A91F48A9FA
20A61EAECC1EAD6D229D4203,56275
2110 DATA A5589D4403A5599D4503A9049D48
03A91E9D49034CB61E608D6C22A91820CD1E20
3A20AD30028580AD31028581,61296
2120 DATA A003A94E9180A006A90E9180C8C0
63D0F7A94E9180C8C8C8B180C90FF0034C3920
A90E9180C84C282060AD0BD4,66398
2130 DATA C95FD0034C47204C3A2060010840
021080042080D6C22A2008A9D8622E8D0F9A900
8D8322A9FECD8322B0034C9D,71406
2140 DATA 20AD832249FF488D8522AD852248
A92248A98520321FAABD8622A86848AABD8622
AE85229D862268AA989D8622,76516
2150 DATA EE83224C612060 8D6C22A5588580
8582A9008D8222A907CD8222B0034C3D21AE82
22A9008D8322A9FECD8322B0,81553
2160 DATA 034CDB208A48AE8322BC862268AA
203E21EE83224CBE208A48A2FFBC862268AA20
3E21AD6622C97FF00590034C,86686
2170 DATA 3721AD8222C902F0034C0421A001
B1808DC402AD8222C903F0034C1521A002B180
8DC502AD8222C904F0034C26,91631
2180 DATA 21A003B1808DC602AD8222C905F0
034C3721A000B1808DC802EE82224CAC20608D
6C22AD64228581AD65228583,96631
2190 DATA A9008D8422A91DCD8422B0034C83
21B18003D4820C900F0034C7021BD482049FF31
824C72211182918 2E681E683,101595
2200 DATA E88A2907AAEE84224C502160205 0
20A9078D632220FB1FA5598D6522AD652238E9
208D6422AD64228559A9018D,106613
2210 DATA 6222A90148A90648A90048A92148
A9B84CBF212A2E4D49439B0020241EA9012000
1EA9018D8222AD6222CD8222,111590
2220 DATA B0034CE521A92248A96E20F11EEE
82224CCC21A90120101EAD6E22C920D0B12060
1FA90148A90448A90048A922,116614
2230 DATA 48A96E20241EA90120001EAD6422
8559AD632220CF1F209E20A90120101EA90085
4D8513A513C90890034C4722,121552
2240 DATA AD1FD02901C900D0032047 22AD1F
D02902C900D00320532 24C2322AD62221869 01
8D62224CA721AD1FD02901C9,126506
2250 DATA 00D003204722 4C5322,127445
```

FADER
A CLASSY VIDEO "SLIDE SHOW"

Featuring dot-by-dot "dissolves" between pictures

by JOSEPH P. GRANDE

If you use Micro-Painter or another file-compatible program to draw pictures with your Atari, you would probably like being able to have a video slide-show presentation. FADER does more than simply read your pictures from a disk and display them one at a time. When FADER changes pictures, it produces a dot-by-dot "dissolve" from one picture to the next. This impressive effect is unique to computer graphics — movie film couldn't duplicate it.

SYNOPSIS

You get a unique dot-by-dot "fade" effect with this "slide show" of picture files compatible with Micro-Painter format. The program requires a minimum of 48K RAM plus a disk drive, and runs on all Atari computers. If you're typing in the listing that creates this machine language file, insert your BASIC cartridge. For Antic Disk Subscribers — just follow the numbered instructions below.

HOW TO USE THE PROGRAM

Type in the program and save an extra copy as a back-up. Next, RUN this program. The screen will go dark for several minutes so the computer can read the data faster. If you made a typing error, the program will stop and display the number of the line you need to retype correctly, so no TYPO is needed. You'll then be prompted to insert the disk on which the machine language file "FADER.EXE" is to be written. Do so, and then press [RETURN]. FADER.EXE is your master version and should be archived on a disk with other utility programs.

Follow the following step-by-step instructions to create your "slide-show" disk:

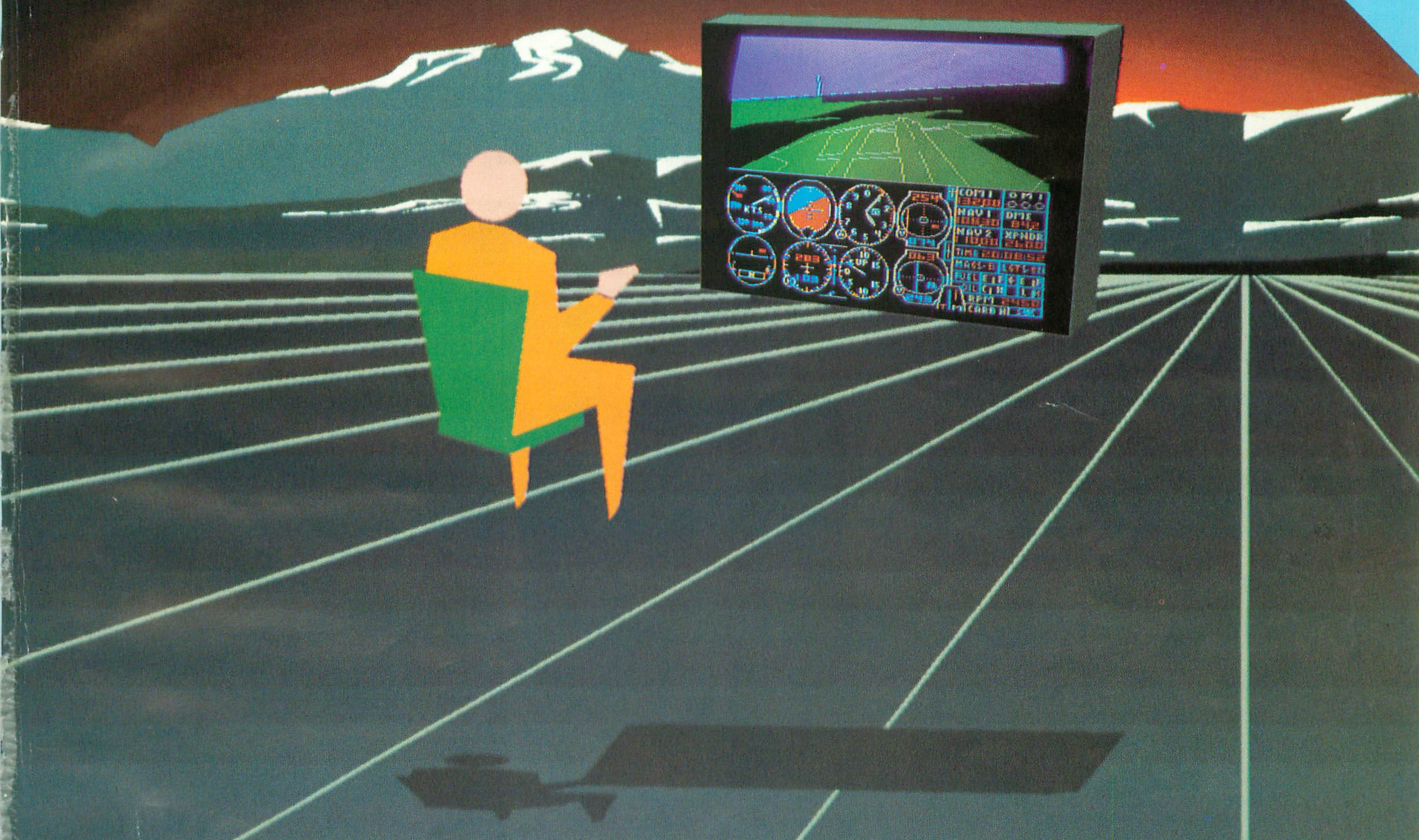
1. Format a blank disk, then use DOS menu option H to write DOS files.
2. To save room on the disk, delete DUP.SYS.
3. Use DOS menu option O (or C with two-drive systems) to transfer a copy of FADER.EXE to the prepared disk.
4. Use DOS menu option E to rename FADER.EXE to AUTORUN.SYS.
5. Use DOS to copy your picture files to the slide-show disk. Copy them in the exact order in which you want them to display. Use option E to rename them so all the picture files extenders are .MIC.
6. This disk can now be booted, and will automatically display all your pictures in sequence. Remove all cartridges before booting. 600XL and 800XL owners press [OPTION] while booting.
7. FADER loads a new picture about every 30 seconds. To load and display the next picture sooner than that, press [START]. After the last picture on the disk displays, FADER loads the first one again, and so on.
8. You can change disks if you do it quickly as soon as a picture has loaded. The new disk should have more picture files, all renamed with the .MIC extender. FADER will start with the next file on the disk. That is, if FADER has just loaded the second .MIC file on one disk, and you remove that one and insert another with, say, five .MIC files, FADER will next load the third .MIC file on the new disk. After it displays the last file, it will recycle to the first.

*Joseph P. Grande of Sunland in Southern California has been a programmer for over 20 years. He says he also became a graphic artist three years ago when he purchased an Atari. He has published a pre-school math learning game, **Monkey Up A Tree**.*

continued on page 97

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For Atari computers with 48K memory



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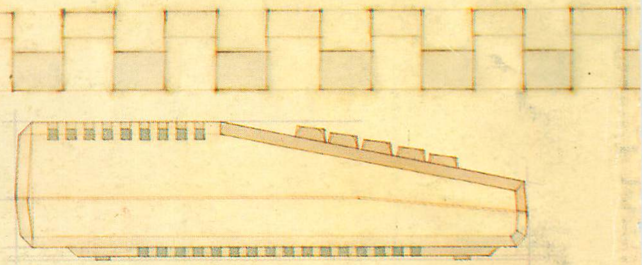
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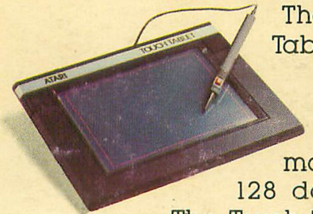
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